Interstate Medical Journal

VOLUME NINETEEN

JANUARY-DECEMBER, 1912

———————

EDITORIAL.

THE PHYSICIAN OF TO-DAY.

Various books, other than those written by medical men in moments of
relaxation, have been published during the year which has just passed,
whose object, we take it, is to show an eager public what the trend of
medicine is to-day, and especially what the personality of the physician
should be to insure, not only a successful career, but what seems to be
all-important to the novelist's mind—the ennobling of the elect in the
medical profession so that no longer will the popular mind associate with
them the frock-coat, the silk hat, the once popular pills and powders.
This endeavor, on the part of our popular writers of fiction, has its
good points as well as its bad; and, as so often happens, especially when a
subject is not envisaged as it should be to bring out all its lights and
shades, the bad preponderate. For the message that goes forth from even
the best-written pages is that scientific medicine is really a matter of
personality, and that if the medical man digests his science thoroughly—
his capacity for knowledge is never questioned—the result is that his
physique becomes commanding in the sick-room on account of a muscular
development that favorably impresses the patient, no matter how ill he
is, and a surety of touch and singleness of purpose that cannot be de-
rived from any other source. Of course, as any medical reader gifted
even with the slightest acumen can readily see, this sort of reasoning is
intensely modern and derives its best sustenance from all those movements
outside the real province of medicine, which are not without some virtues,
but which are faulty in that the hope is expressed, in no disguised man-
ner, that before long the tried methods, which obtain with medical men
to-day, will be altogether supplanted by what is faddy and pure nonsense.
As an illustration to what lengths this sort of thought can drive an other-

wise temperate man of letters, there is none better before the reading
public at the present moment than Robert Herrick's latest novel "The
Healer";* for in this exceedingly well-written book we have the strong
frame, the assuring touch emanating from muscle and nerve, the com-
manding presence—in short, all those physical attributes which, accord-
ing to the author, are absolutely necessary in the sick-room if the
miraculous is to take place.

There is no need here to go into the details of this latest lucubration
from a novelist's brain, except to say that a book of this sort should
not be lightly weighed by the medical profession, for it carries on its face
the impress of seriousness and a spurious profundity that will no doubt
move many readers to enthusiasm. And, this being the case, it is meet for
us to point out wherein the book will raise many false standards in the
minds of the superficial.

It is well in its way to say that the unthinking contingent in our com-
munities counts for nothing; but why assume this supercilious attitude
when truth declares that an opinion, no matter how foolhardy, carries
weight if it is a question of the appearance and bearing and manner of
conduct of the physician in the sick-room. And, according to our glean-
ings from the volume under consideration, the short, stout physician,
with a shortness of breath and minus the cool five fingers which, following
the dicta of all our latter-day novelists, control the vagaries of the suffer-
ing by mere contact, is but a poor second to the physician who measures
six feet or more, has the desired hand, and by sheer muscularity im-
presses his patient at once as something out of the ordinary. And this
discomfiture, nay, this extreme unpopularity, no matter if he has the
science of medicine at his fingers' ends.

Yes, truth to tell, we are far removed from the mild and obsequious
physicians who are so plentifully strewn over the pages of Dickens and
Thackeray. We are even leagues in advance of Lydgate, that perfect
portrait of the every-day physician galvanized into life-like attributes by
the genius of George Eliot, and who "had a youthful belief in his bread-
winning work [and] went to study in Paris with the determination that
when he came home he would settle in some provincial town as a general
practitioner   . . .   and win celebrity, however slowly, as Jenner
had done, by the independent value of his work." But are we nearer the
truth? and is it an incontrovertible fact that the physician of to-day de-
pends for his success in battling with disease on the impression his per-
sonality carries to the sick? Has earnestness taken the place of knowl-
edge, the power to transfix a wandering mind the place of drugs, a domi-

---

*New York: The Macmillan Company. 1911.

nant muscularity—of course, always accompanied by the cool hands—the place of an appreciation of pathology? In short, is the physician of to-day a *poseur* who easily passes into a snob, or is he an earnest worker who regards his personality of lesser importance than his scientific training?

The matter of personality has been overdone a bit of late. When the term was first used, in the modern sense, by lay and medical writers, it had a certain fascination; but this could not endure, for once it became popular it was bestowed on all sorts and conditions of people, with the result that it became absolutely meaningless. But in its pristine state— that is when it defined a mentality that was all-pervading—it stood for much, though even in the most halcyon days of its reputation as a likable word, it was never admitted to be a more striking attribute in a six-footer of slender waist than in one of stubby growth, whose girth was far from graceful. But, say our writers of to-day, we have changed all this; and, though we are only novelistic psychotherapists, it cannot be gainsaid that for personality to exercise its potent charm in the sick-room its encasement must never be akin to Dr. Slop's, so graphically described by Laurence Sterne as "a little squat, uncourtly figure   .   .   .   of about four feet and a half perpendicular height, with a breadth of back, and a sesquipedality of belly, which might have done honour to a serjeant in the horse-guards."

MAETERLINCK'S ARRAIGNMENT OF THE PHYSICIAN.

That the physician of feeling whose conscience is not in complete abeyance cuts a sorry figure in the presence of hopeless pain has been dwelled upon before by numbers of writers; but never to our thinking has the subject been so sanely and wisely treated as it is by Maeterlinck in his recently published book.* We do not mean to say that what the Belgian dramatist preaches can be followed to the letter in the sick-room, but what he says must give birth, in the mind of every thinking physician who peruses his lines, to further and deeper thought in connection with the momentous question, whether he has the right to put a stop to pain even if only a few hours of a patient's life are sacrificed thereby. Now just because of Maeterlinck's trenchant words on the subject —and without further ado we can assure the reader that he advocates the shortening of life by some hours if pain can be assuaged at the expense of the waning vital forces—we need not bristle up at once and

*Death. By Maurice Maeterlinck. London: Methuen and Co. 1911.

shout: "Nonsense"; for if what he says is true,—namely, that "it is not death that attacks life; it is life that wrongfully resists death," then any therapeutic measure we use to prolong the hopeless battle is just so much more torture for the patient.

As we said before, much has already been written on this subject, but have many physicians given it the attention it deserves? To most of us the advocacy of painless death means only one thing—the interference of the physician to such an extent that many hours, if not many days, would be cut off a patient's life when it is a gamble whether death is going to be an actuality in the immediate future.

At once let us say that this thought is far removed from Maeterlinck's contentions, for what he wishes to convey to his readers—and now we have the quotation, which we have mentioned, in mind—is that the prolongation of life, when the physician knows positively that even though he can combat pain, not only will the pain return to be combated again, but with each return the life-forces are weakened, hence the loss of resistance and the greater the agony, is a decidedly unwise procedure; for, instead of assisting the coming of death, he crushes pain and thereby keeps the spark of life fitfully alive. But to continue Maeterlinck's line of argument in his own words: "All the doctors consider it their first duty to protract as long as possible even the most hopeless agony. Who has not, at a bed-side, twenty times wished and not once dared to throw himself at their feet and implore them to show mercy? They are filled with so great a certainty, and the duty which they obey leaves so little room for the least doubt, that pity and reason, blinded by tears, curb their revolt and shrink back before a law which all recognize and revere as the highest law of the human conscience."

We hold no brief for what Maeterlinck writes on this most important subject, nor do we wish to advise what course to pursue, since there are no two cases which are alike. If the time should ever come when the physician shall take upon himself the responsibility of destroying the mere glimmer of life in the hope of shortening "hopeless agony," his judgment may justify his act. But even though his judgment may be correct in some cases, will he not feel that perhaps it was too hasty in others, and that he overreached himself in his enthusiasm to prevent suffering? On the other hand, should he always array his forces on the side of life and never on the side of death? We know what Maeterlinck thinks.

EUGENICS.

Galton's definition of "eugenics" is "the science which deals with all the influences that improve the inborn qualities of a race." Such a science deserves more than the passing attention of medical men, and just now a good opportunity is afforded to centre attention on the subject. Word comes from London that a vigorous attempt is being made to gather funds for a laboratory building for Professor Pearson, the first Galton Professor of Eugenics at the University of London. It may be remembered that at Sir Francis Galton's death, the residue of his estate was left to provide for a professorship of eugenics. Already much good work has been done on the foundation, but the limitations of working facilities have prompted the issue of the call for funds for a building.

If Galton's definition of eugenics be accepted, it would seem to be not a difficult problem to solve on paper. But practically the situation is far from simple. Breeding-laws for animals are well known; agricultural experiment stations are teaching the farmer how to improve his stock; yet practically nothing is being done to help the poor human to improve his posterity. Governments spend millions to eradicate an infectious disease of animals, but it is notorious how difficult it is to obtain money to eliminate communicable diseases among men—tuberculosis, for example. Of course, the prevention of disease is only one small fraction of the new science of improving the human race, the fraction which hitherto has received the most attention. Almost the only other phase of the broad question which has received any attention is the handling of the mentally or morally defective,—the prevention of propagation amongst the insane, the criminals, the alcoholics, or the degenerates. Only recently we discussed in these columns various methods of dealing with this particular aspect of the problem, and we shall here only insist that segregation is by itself entirely insufficient.

By far the most interesting and probably the most important aspect of eugenics is that which deals with the intrinsic improvement of the individuals of the human race. Prevention of disease and of degeneracy is comparatively easy to accomplish, because here the man of science can logically demand state aid. But where the question does not affect the state, the situation is more difficult. Improvement in the cattle or in the corn crop will be assisted by the state, because the cry of personal liberty cannot be raised by the dumb animals, but man, not being a dumb animal, refuses to allow the state to enforce a marriage union which the man of science considers will beget the healthiest children. Marriage is probably the strongest expression of individualism possible in

modern conventions. But it were, indeed, well for sensible persons to awake to the call of posterity; to realize the value of the laws of heredity; to know, for instance, that by all the laws of probability two persons tainted with nervous dispositions will endow their offspring with similar dispositions and thus handicap them in life's battle. It would indeed be a benefit to the human race if less attention were paid to a large birth-rate and the help of the law of the survival of the fittest, and more to improvement of the individual birth. But at the present day we fear that actually not much can be expected; Jack will marry Jill and let the children care for themselves; the divine passion will triumph and the wee small voice of the Superman remain unheard.

Not for a moment do we wish to be interpreted as being opposed to as wide a distribution of knowledge of eugenics as is possible. Education of the sort that has been so much agitated recently is the only weapon at present available, and we need only remember what has already been done with sex hygiene to feel the promise of future good in the new field. Formerly it was almost criminal to tell an adolescent the meaning of the wonderful awakening; now it surely is criminal not to explain sex matters freely and honestly to every child at or before puberty. The same methods should be employed in spreading the doctrine of eugenics. Ibsens' "Ghosts" and Brieux's horrors of "Maternity" represent not a natural sequence of present conventions, but an awful possibility, due usually to ignorance. Men and women both should be told what the marriage state really is; to-day, on the one hand, there is entirely too strong a view that marriage should be based on pure sentiment, and, on the other, apparently, the view of the modern French playwright,—that it is only a state of legalized prostitution. If it were not for the children, men and women could marry whom they choose, but they must realize the duty they own society and themselves. The broadest field of eugenics, as we conceive it, is the education of persons in all classes of life along lines showing "the influences that improve the inborn qualities of a race." This will be an uphill process, as all battles for truth against accepted prejudices are; but it is one well worth while, and one in which physicians must enlist.

OPINION AND CRITICISM.

THE DIVAGATIONS OF MME. CURIE.

Within the last two months an amusing spectacle has been presented to the world, in the shape of much unnecessary comment, just because a woman of science has seen fit to follow her own inclinations in regard to a strictly personal matter. Why the fair brow of science should be besmirched, as it has been, because of the unconventional act of Mme. Curie is beyond the comprehension of the writer of these lines; but in the turmoil of gossip science has suffered as much as Mme. Curie, and both, be it said here, unjustly. In the first place, we are bold enough to say that the heroine of the episode, which involves Professor Langevin, is a woman first and then a scientist; not the reverse, since, long before she discovered radium and was the recipient of the Nobel Prize for outstanding work in chemistry, her womanly instincts were manifest; and, secondly, is science so strenuous a taskmistress that feeling, emotion, sentiment must necessarily be killed off? Again, science is here in the world for certain appointed work and not as a guardian of the morals of her votaries, no matter whether the contention of the Philistines proclaims the contrary; and, by attending to her appointed work, her hands are full, indeed, and any lapse, on the part of any of her followers, from an arbitrary standard of morality erected for any one occasion by those who are always talking about one standard for both sexes, but practising many, is really no concern of hers. But then Mme. Curie is a Pole, not a born Frenchwoman; and in the eyes of Leon Daudet, that obstreperous son of a gifted and gentle father, the unforgettable author of "One of the Immortals," no crime could be more heinous than for a "foreigner" to outrage the sanctity of a French home!

In a book which has recently appeared in Paris—André Beaunier's "L'Homme qui a perdu son Moi" (The Man Who Lost His Ego)—the idea is advanced that the man of science is often so thoroughly wrapped up in his researches that all other interests fail to appeal to him; and only after years of work in the laboratory, and when outraged Nature reasserts her rights as she is bound to do, at one time or another, so as to recall him to the fact that he too is human, does he realize that he has reduced himself to an automaton, and that his individuality has been crushed. And granting that this is so, can not the fair-minded critic of research work see the reasons why a goodly part of the work, which comes from the laboratories, is so far removed from the practicalities of life that its applicability is perfectly useless?

Now what has so novel an idea to do with Mme. Curie's unconventional act? A great deal, we assert; for if she is still human—and certainly the recent expression of her emotional and sentimental nature speaks loudly on behalf of this quality—her work in the future will equal, if not outdistance, her accomplishments in the past. Perhaps, for all we may know, the minds of the author of "The Man Who Lost His Ego" and the discoverer of radium worked out this line of thought synchronously: the woman by communing with her better self, as shown in her work; the man, observant and thinking; both cogitating for the betterment of mankind. And if it is true that our researchers soon deteriorate into machines by reason of their blind devotion to work, and that without the human note in their endeavors much is lost to the world, should we not praise the daring of one who had the courage of her convictions, despite what she knew would be the consequences to her reputation, so that her individuality could continue to stand her in good stead in all her future labors?

LITERARY NOTES.

The usual "popular" book on the manner of commanding one's nerves is, with few exceptions, a thing to be shunned by the medical man of intelligence; for if written large across the pages is so much that is visionary, that to give it serious thought, even for so short a space as an hour or two, cannot possibly be aught but a sheer waste of time. Of course by "popular" is meant those books written by misguided physicians with an acute eye on the public, but with no seeing eye on science, and whose only excuse for these publications is that they imagine the public is clamoring for some knowledge so that their symptoms may be lessened, when in truth they are invariably increased. But though this may be true as a generalization, every now and then a book is written on popular lines that has excellent qualities; and of all the recent works of this ilk—and their name is legion—the most satisfying to our mind is Dr. J. W. Courtney's "The Conquest of Nerves" (The Macmillan Company, New York). Why this author's book is fit to place into the hands of some distraught patient will become apparent to the physician directly he reads one or two chapters, for the author maintains without any effort the right equipoise between science and "popular talks," and moreover displays a sanity against which the current lay theories of to-day, in regard to mental upsets, would find but small welcome. Now it may seem an easy matter for a medical man to write down to the intelligence of the man in the street so that both science and common sense will be respected; but if anyone is of this opinion, one attempt will soon show him how many difficulties will spring up. And just because Dr. Courtney has

cut this Gordian knot, we feel that his book is far above the average, and can even be read by the general practitioner with no fear that he is wasting his time.

———

When a book is as well written as is "Phases of Evolution and Heredity" by Dr. Berry Hart (Rebman Company, New York), the captious critic should silence his remarks even if his desire is the greatest to point out to the reader that originality is altogether lacking. Of course, as we all know, originality is thought by the majority of purchasers of books to be the one quality which a book should possess so as to justify to themselves the outlay of money; but though, as we have already said, there is nothing in this book that has not been said before, no one, who is not already deeply versed in Mendelism, could do better than own so engaging a volume. Dr. Hart writes not as a scientist but as a novelist, and, this being the case, the distraught brain that has vainly tried to fathom the intricacies of the theories of Johann Gregor Mendel will glory in the simple tale as unfolded by this writer. Lucidity occurs so seldom in German and English books of a scientific nature that, when it is mastered by an author in connection with a charming style, it should come in for unstinted praise. All the chapters in this book are worth while, but especially should this remark be applied to the last chapter—Men Who Have Revealed Themselves, though the captious critic, again, may object to this excellently written essay in a book on heredity. But, whether we approve or disapprove of this chapter in a book of this nature, he must be a biased reader, indeed, who is proof against the charm of one of the cleverest essays on this subject that it has been our lot to peruse.

———

"Scientific medicine" is a term that bears all the hall-marks of modernity, for only latterly have we made it the *pièce de résistance* of our medical conversation. We imagine that, if it were possible for the elect among the medical men of the first half of the nineteenth century to re-appear among us, great would be their astonishment to learn, not only what progress medicine has made, thanks to the laboratory, but how different our conversation is from theirs in the matter of interlarding our remarks with the latest news about bacteria and protozoa, the cancer problem, experimental medicine and the treatment of infectious diseases. Now, though a goodly number of us do a bit of spurting about "scientific medicine" when it is not wholly necessary to do so, or when we are but ill-prepared to tackle the subject, the fact remains that "scientific medicine" is the order of the day, and that without considerable knowledge of the work done in our laboratories, the physician really hazards the welfare of his patients. To remind us of what has

really been accomplished to take the study of medicine out of the slough of doubt and place it on a firm basis was evidently the incentive of the book which has come to our desk, and which bears the title "Scientific Features of Modern Medicine" (Columbia University Press, New York). Dr. Frederic S. Lee writes interestingly on the subject, and shows, in the various chapters, that his survey of the great progress which has been effected since the middle of the last century is quite complete. His manner of writing is far from turgid; his handling of the subject-matter indicates the thinking mind; and when we add to these qualifications a judgment that is sane and never rapturous, we feel we have conveyed to the reader an idea of the many excellences of this book.

———

Those physicians, who are members of societies which have for their object the inquiry into the conditions of prostitution in this country, should by all means read the exhaustive study, "The Social Evil in Chicago," which has recently been published by the Vice Commission of that city. That the work undertaken by the Commission is one of a thoroughness that leaves nothing to be desired is evident after reading a few pages; but what is more important than the deep probing into the matter, so as to produce statistics, is the description of the life of the prostitute, who is not only the chattel of the owner of the establishment in which she happens to be, but whose slightest demands for personal liberty—a demand conceded to all other human beings without let or hindrance—is enmeshed in a most complicated network, on account of hush-money and tribute-money that our false standards of commercialism and Puritanism have bred. The book is written in a calm, collected mood and, in this respect, is a much more effective work than the innumerable hysterical articles which have recently appeared, in various lay journals, on the psychological reasons why the ranks of prostitution are never without recruits. But its strongest point is that the Commission does not champion the suppression of the evil, but the abolition of the leeches, whose graft on the American prostitute is probably the darkest page in the social history of this country.

ORIGINAL ARTICLES.

SOME RECENT ADVANCES IN OUR KNOWLEDGE OF THE
ANATOMY AND PHYSIOLOGY OF THE HEART, AND
THEIR BEARING ON THE DIAGNOSIS AND
TREATMENT OF CARDIAC ARRHYTHMIAS.

By Thomas E. Satterthwaite, M. D., of New York.

During the last ten years a series of investigations has been carried
on with reference to the gross and minute anatomy of the heart, the re-
sult being that some important discoveries have been made. At the same
time physiologists have altered some of our former conceptions, espec-
ially as to the reciprocal relations of cardiac, arterial and venous activi-
ties. This has been accomplished by a conjoint use of some of the newer
recording instruments, of which the electrocardiograph and the phono-
photograph are examples.

Of the first series of investigations alluded to, the discovery of the
auriculoventricular or His bundle, its point of origin and its final distri-
bution, is the most noteworthy result. The gradual steps that led to the
discovery are worthy of summarizing. In the first place, it has long been
known that at an early period in embryonic life the heart is a tube, at
one end of which is the *sinus venosus,* where the venous trunks unite
(Fig. 1). From this tube pouches develop, to become on the one hand
an auricle (B) and on the other a ventricle (A), while the original
tube still connects them. Later, in connection with the sinus are formed
the superior vena cava (H) and the inferior vena cava (F), a portion
of the right auricle and the coronary sinus. Eventually this primitive
tube is converted into the His bundle, known to some as Gaskell's bridge,
or the auriculoventricular bundle which unites auricle with ventricle.
Studies were first made on the hearts of amphibians and reptiles, where
the beat originates from the sinus venosus; in mammals, however, accord-
ing to Lewis, sinus and auricle are usually fused together.

In the lower vertebrates, the sinus venosus, auricular canal and aortic
bulb are still recognizable, but not so in the human species.

The remains of this sinus, however, have been discovered by Keith
and Flack,* and located at the mouths of the venae cavae. Previously,

---

*Keith and Flack (*Journal of Anatomy and Physiology*, Vol. XLI, pp. 172-189,
1907).

Keith, His and others had found the primitive tube (which eventually becomes the bundle) extending over from auricle to ventricle. The node was first called from its discoverer, Tawara's node.* It is situated in the wall of the right ventricle, near the mouth of the coronary sinus. Tawara, Keith and Flack were able to trace the auriculoventricular bundle to the auriculoventricular septum, from which its branches extend into the walls of the ventricles.
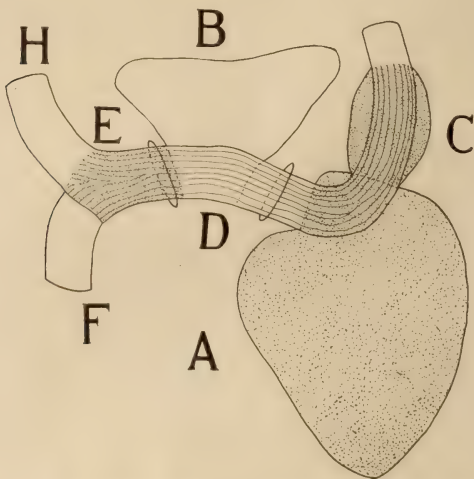
Fig. 1.

In Fig. 1 (I) is the primitive mammalian tube, indicated by longitudinal striations, extending from the sinus venosus (E), where the upper vena cava (H) and the lower vena cava (F) join, through the bulbus cordis (C) to the aorta. (B) is the primitive auricle and (D) the auricular portion of the primitive tube, or auricular canal. The bulbus cordis is eventually included in the human right ventricle. (Schematic representation after Keith.)

The bundle curves over to the membranous septum, entering and following the moderator band (F), until it reaches the base of the large group of papillary muscles (G). According to present views, this bundle of muscle-tissue connects auricle and ventricle functionally, the impulse originating in the auricle and passing gradually into the right and left groups of papillary muscles.

Briefly, the work of Wooldridge, Tigerstedt, Gaskell, Kent, His, Retzer,

*Tawara: Das Reizleitungssystem, Jena, 1908.

Braeunig and Tawara* has proved that round about the coronary sinus and at the base of the septum there is a specialized group of auricular fibres now known as the auriculoventricular or Tawara's node. From this point the bundle runs at first almost horizontally forwards and to the

Fig. 2.

Human heart showing the origin, course and distribution of the auriculoventricular (His) system. The anterior walls of the right ventricle and right auricle have been removed. The intra-auricular septum, the tricuspid valve, the papillary muscles (G), the moderator band (F), and the interior of the infundibulum (H) are exposed. (A) lies in the right auricular appendix, (B) in the fossa ovalis, (E) is placed beneath the mouth of the coronary sinus. Directly beneath (D) is a fan-shaped bit of muscle; a bristle has been placed beneath it. From this point the auriculoventricular bundle and its right branch are traced as they lie on five bristles between (D) and (F).

From a specimen in the possession of Keith.**

left, ensheathed in a fibrous canal, and it pursues its course directly to the right of the central fibrous body of the heart, as far as to the membranous part of the septum of the ventricle. At the anterior part of this

*For further references to their work, see Lewis on "The Mechanism of the Heart Beat," pp. 7-8.

**Lewis: Mechanism of the Heart Beat, London, 1911.

membrane the bundle divides, entering the left ventricle immediately beneath the centre of the aortic valve. Ultimately its branches are continuous with the subendocardial network of Purkinje's fibres which lines most of the interior of both ventricles.

The bundle thus constitutes the functional union between the auricle and ventricle, and it is through this structure that normally the impulse from the auricle originates and causes ventricular contraction. But the structure of the various divisions of this system varies considerably. At the auriculo-nodal junction the fibres are those of smooth muscle tissue, interspersed with connective-tissue, nerve fibres, and ganglion cells. In their course the muscle fibres increase in size until they form networks, and finally take on the well-known character of Purkinje's fibres.
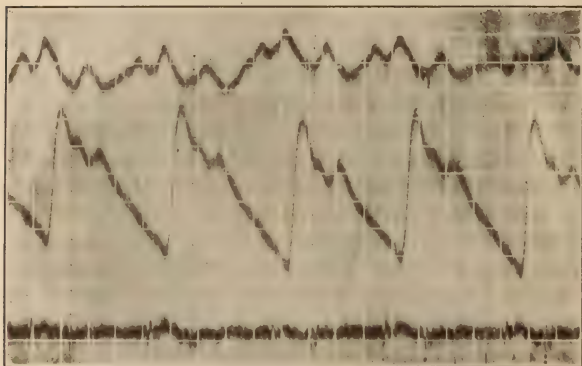
Fig. 3.

In Fig. 3 the upper tracing represents the jugular pulse, the middle the radial, the lower the heart sounds as photographed. By following with the eye the vertical white lines, the relations in time between the heart-sounds and the radial and jugular waves are seen.

Apropos of this point of origin for muscle contractions, at the last meeting of the German Congress for Internal Medicine, in April, 1911,* Hering stated that he had found that the source of the contractions was not always at the auriculoventricular or sinus node, for after removal of the node in dogs and cats the impulse was not checked. In fact, he had found that the origin of the impulse might be in the auricle or ventricle, or some point between them, and constitute auricular, ventricular, or auriculoventricular extrasystoles. And he maintained that by the use of the electrocardiogram he could determine the precise auricle or ventri-

*Verhandl. des Deutsch. Congress, p. 211-226, 1911.

cle in which the contraction took place. This was new. He also added that the point of origin of cardiac contractions might change. The result of accident to the node would be that some other area, whether in an auricle or a ventricle, would originate the impulse vicariously. That in other points than the auriculoventricular node contractions could originate was, however, previously known.

In extrasystole, according to Nicolai of Berlin, the point of origin is movable. For he holds that the normal electrocardiogram shows that the impulse moves from the base to the apex and then back again, in contrast with Hering's idea that it may originate in any of the four chambers or the septa. According to Nicolai* there are three types of extrasystole: (1) That which originates about the apex, (2) that originating about the base, and (3) that where the point or origin is in the right ventricle.

The Einthoven type of electrocardiogram, he claims, is derived from the left heart exclusively. In fact, by means of physiological experiments he undertakes to show that the wave starting from the left heart near the auricle gives the classical Einthoven curve, while the wave starting from the apex in the right ventricle is of the inverse type, which instead of the ascending limb has the descending limb of the so-called reverse type of electrocardiogram.

One of the most interesting of recent developments has been that of Ohm of the Kaiser Wilhelm Institute of Berlin.** Working under Kraus, he has been able by special apparatus to photograph the heart-sounds on paper, in the form of waves, contemporaneous with tracings of the arterial and venous pulses. This method might be called phonophotography. His method I have not yet seen published, but the following illustration, Fig. 3, shows the three tracings registered simultaneously by him.

The first heart sound is seen to be contemporaneous with the beginning of the systolic radial wave and the highest wave of the jugular. The second heart-sound corresponds in time with the third wave of the jugular and the dicrotic notch of the radial tracing. The first wave in the jugular tracing, on the other hand, corresponds to the presystolic wave of the radial; and Ohm would call it therefore the presystolic wave. The second or highest wave of the jugular, owing to its relation in time with the systolic upstroke of the radial, he would call the systolic wave; while the third wave corresponding in time with the dicrotic notch, he would call the dicrotic wave.

There is a minute difference in time between the first heart-sound and the second or highest jugular wave; the third wave of the jugular actually precedes the second heart-sound by 1/24 second.

But, in taking the carotid and jugular pulses conjointly, he has found an exact correspondence in time between the diastolic wave of the jugular with the dicrotic wave of the carotid and the second heart-sound,

This dicrotic point, he maintains, corresponds to the closure of the aortic valves.

Auricular fibrillation, as a cause of irregularity of the pulse, has been recently described by James Mackenzie (Hare's "Modern Treatment," Vol. 1, p. 22), where he says he is now prepared to call by the name auricular fibrillation what he previously named nodal rhythm—the permanently irregular pulse of Hering. He further defines this condition as one in which the cardiac cycles vary continually in length, there being no sequence of beats having the same length. Another criterion is that, on the appearance of the irregularity, the auricle systole stops. Mackenzie holds that auricular fibrillation exists in 70 to 80 per cent. of arrhythmias. In 1902 he ascribed this condition to paralysis of the auricle, but having found that there was actually a simultaneous contraction of auricles and ventricles, he put the source of the difficulty at the auriculoventricular node, which governs auricular and ventricular contractions through the bundle of His.

In 1903 Cushing and Edwards suggested that in some of these patients the cause might be auricular fibrillation, a condition in which component parts of the muscle wall of the auricle contract independently of one another, and in such a disorderly fashion that it might almost be said auricular contraction as a whole was at a standstill. But it was not until 1909 that researches by Lewis on the lower animals showed, by means of comparison between the arterial and venous pulse-tracings and electrocardiograms, that this so-called nodal rhythm, or permanently irregular pulse, was to be attributed to auricular fibrillation.

Now in fibrillation there seems to arise in the auricle a continuous shower of stimuli, which falling on the node excite it to send stimuli to the ventricle as rapidly as the bundle (and so the ventricle) is capable of taking them up. At first the ventricular contraction is apt to be very rapid, and the patient may die rapidly of heart failure. But if the ventricle can be made to beat more slowly, the patient may lead a useful and even vigorous life for some years. It is therefore very important to diminish the rate, and this is done by digitalis in a remarkable manner. The gravest sign is an increase in rate; say from 100 to 150. The digitalis should then be pushed until there is a fall to 80. My experience tallies with Lewis's view; for, in the permanently irregular pulse, relief only comes from the continuous use of digitalis or strophanthus. Hering recognizes this fact. Mackenzie believes, however, that a good deal can be done for the patient. He finds, for example, that the irregularity is most often associated in rheumatic hearts, usually those of mitral stenosis, and in the fibroid heart of senility. In fact, as this deposit of fibroid tissue is common in both these varieties of cardiac disease, it seems possible that the fibroid deposit is the cause. In one case of mine, there was a fibroid tumor of the uterus; its removal did not improve the cardiac difficulty, however.

According to Lewis, auricular fibrillation constitutes 50 per cent. of all irregularities, the disturbance of cardiac rhythm having its origin in the auricle, and being due to temporary or permanent incoördination of the musculature of this chamber.

In a study of 106 cases, he has reached the following conclusions, which vary, however, somewhat from those of Mackenzie. The character of the radial pulse is very striking. The rate may be reduced as low as thirty, or increased to as high as 200, but the rate in itself has little significance, because many beats of the heart may not reach the radial artery. But the fast rates, viz., between 110 and 150, are the most
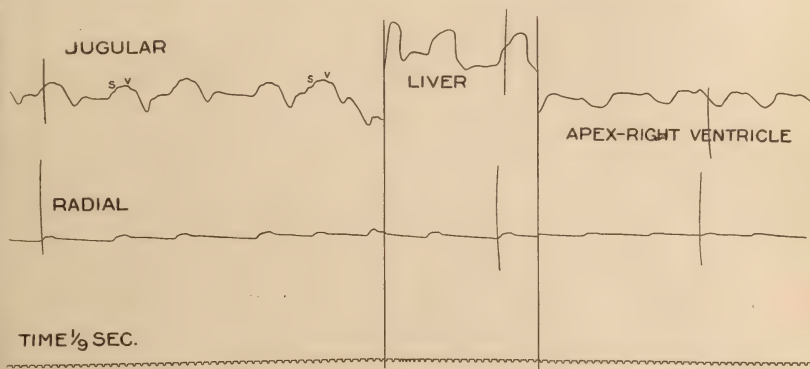
Fig. 4.

In Fig. 4* is seen in the jugular tracing of what is now called auricular fibrillation, formerly called by Mackenzie nodal arrhythmia, in a patient with a double mitral lesion, tricuspid regurgitation and auricular paralysis, in so far as that the apex beats are irregular, while the auricular waves are absent in this particular tracing.

(S) is Mackenzie's auricular wave (A), and (V) is Mackenzie's carotid wave (C).

common, and with these the irregularity is greatest. Now, according to him, there are two criteria of auricular fibrillation: (1) Seldom or never in any one case do cycles of the same length succeed one another; and (2) there is no definite or continued relationship between the strength of a beat and the pause which precedes it. These two criteria are shown in the tracings of Fig. 4.

Lewis holds that normal auricular action may be in abeyance, while the peripheral circulation is unhindered. He says, as a result of comparing arterial and venous pulse-tracings and electrocardiograms, that auricular

*Newer Conception of Cardiac Arrhythmias (*Medical Record*, May 15th, 1909).

fibrillation is responsible for most of the disturbances of the ventricular
system. Indeed in the vast majority of instances, a sphygmogram show-
ing that no two successive heart-beats are of the same length means
the diagnosis of auricular fibrillation (Fig. 4). In advanced mitral
stenosis this is the rule. (He refers to acquired mitral stenosis.) To
Cushny, Mackenzie, Wenckebach, Rothberger, Winterberg and Lewis the
credit of the discovery is due.* Janowski** has known such a case to
last five and a half years, Mackenzie ten years.

The central nervous system is known to furnish the heart with two
sorts of nerve fibres. One of these, known as the inhibitory, reaches the
heart through the medium of the vagus. Their activity will slow or even
arrest the heart's action. Luciani calls the vagus the diastolic nerve
of the heart, its stimulation causing dilatation of both auricle and ven-
tricle.† The second sort of fibres reaches the heart through the medium
of the sympathetic system. They are known as accelerator fibres be-
cause they quicken the heart's action. The upper and lower branches
of the vagus unite in the heart with the sympathetic network so as to
form the cardiac plexus, filaments from the vagus, however, terminating
in the sino-auricular node, i. e., the remains of the sinus venosus.

Both vagus and sympathetic fibres are efferent in character, but there
are also afferent filaments, carrying sensations away from the heart.
Some of these are stimulated at each beat of the heart. These latter
fibres may cause painful sensations, for the stimulated vagus may send
radiations to various sensory nerves. Pain in the gums and throat may
be due to radiations from the vagus to the fifth nerve. But the cardiac
plexus lies on the arch and ascending portions of the aorta, and from it
the heart receives both its inhibitory and accelerator fibres.

Now, as the result of a very large number of experiments, it seems cer-
tain that the vagus affects both the rate and the force of cardiac contrac-
tions, and also the conductivity of contractions that normally pass from
the auricle to the ventricle. The familiar experiment of pressure on the
vagus in the neck causes, it will be remembered, slower and stronger car-
diac contractions, while, on the other hand, if the auricle is injured in any
way or pressed upon, permanent or temporary loss of conductivity, as
the case may be, is liable to follow. Indeed, experiments have shown
that injury to the auricle or pressure on it may so disturb the conduc-
tivity that, of several auricular contractions, few or perhaps only one
ventricle contraction may follow; in other words, there will be heart-
block. Direct stimulation of the vagus in the lower animals may even

*Cushny (*Amer. Journ. Med. Sciences*, 133, pp. 66-77).
Mackenzie: Diseases of the Heart, London, 1908.
Wenckebach (*Archiv. fuer Anat. und Phys.*, pp. 1-24, 1907).
Rothberger and Winterberg (*Wien. klin. Wochenschr.*, 22, pp. 839-844, 1909).
Lewis (*British Med. Journ.*, 2, p. 1528, 1909).
**Janowski: Functionelle Herzdiagnostik, Berlin, 1910.
†Luciani: Physiologie des Menschens, Munich, Vol. 1, pp. 168-173.

keep the heart inhibited for several hours;* or the inhibition may be indirect, and due to a blow on the abdomen, or distention of the stomach or intestines by gas. This latter accident can cause the heart to stop entirely. I have seen a case of complete temporary heart failure of this kind, in which the respiration also was totally suspended synchronously.

A probable explanation of this phenomenon by Howell** is that the afferent impulse conveyed to the central nervous system stimulates those nerve cells in the medulla that give origin to the inhibitory fibres causing cessation of cardiac action; and yet, too, an afferent impulse may excite the activity of the accelerator nerves, by reacting on their roots, presumably somewhere in the brain. The group of cells from which the vagus arises comprises the so-called cardio-inhibitory centre, but its anatomical site is unknown. These cells in health should presumably be in constant tonic activity; and it is through their influence that the rate of the pulse is kept down by their opposition to the activity of the accelerators. For the rate of a pulse is due to the resultant of the antagonistic forces of these two opposing agencies. Furthermore, recent discoveries by Hemmeter, to be alluded to later, show that there are both inhibitory and accelerator ganglia in the heart itself. The advantage of such a "balanced mechanism" is that each of the antagonistic forces is peculiarly susceptible to a stimulus.

Though we are obliged to theorize from a rather limited amount of knowledge as to the anatomical site of these nerve impulses, this much we know : that the rate of cardiac contraction depends on various conditions, such as sex, age, size, blood-pressure, muscular exercise, and the composition of the blood. For we know that women have a higher rate than men, large individuals have a slower rate than small ones, and, while the average rate at birth is set at 140, it falls gradually toward 70 in senility, rising again gradually towards 80 in extreme old age. Also, as blood-pressure in the arteries falls, the pulse-rate rises, while as the pressure increases the rate falls. So, too, the rate increases under vigorous muscular exercise. In some alterations of the blood, as in asphyxia, where the CO_2 content rises, the pulse-rate first increases and then decreases, as soon as toxic symptoms supervene (Howell). These facts should always be borne in mind in estimating the significance of a high or low pulse-rate.

Bearing on this matter, the following interesting facts have been reported to the writer in a private letter relative to work done at the Marine Biological Laboratory at Wood's Hole, Mass., during the past summer.† Experiments on sharks, dogfish and sea turtles to the number of 346 demonstrated the existence of both accelerator and inhibitory ganglia in the sinus venosus and auricles of their hearts. Stimulating the

*Mills (*Journ. of Physiology*, 6, p. 246).
**Textbook of Physiology, 1911.
†Prof. J. C. Hemmeter, of the Department of Physiology at the University of Maryland.

inhibitory ganglion from a normal of 36 would slow or arrest the heart, according to the intensity of the electric current. Section of the vagus, however, caused no acceleration in the sharks and dogfish; therefore, the vagus was not in tonic activity.

It was also found that iodothyrin favors vagus inhibition. This suggests a remedy for the pulse of persistent arrhythmia, where a reduction of the rate is essential in the treatment. It was ascertained, further, that inhibition of the heart by the vagus is not due to a chemical substance, such as potassium chloride, in these animals, at least; for the experimenter connected the aorta of one shark with the auricle of a second shark, so that the blood from heart No. 1 went into heart No. 2, and then stimulated the vagus of No. 1, which was brought to one-half its former rate and finally stopped, but without producing any change of rate whatever in heart No. 2. If vagus inhibition had been due to any chemical substance, it should have passed into heart No. 2, whose vagus was not stimulated, and slowed it, but it did not.

From the above recital of some of the more important discoveries that have recently been made in matters relating to the anatomy and physiology of the heart, it is apparent that each has an important bearing on diagnosis and treatment, but it is also equally plain that there remain fruitful fields for further research along the same general lines.

Furthermore, every future discovery relating to the mechanism of the heart's action will not only add to the sum of our knowledge, but will also aid us in understanding and managing cardiac diseases.

PAGET'S OSTEITIS DEFORMANS: REPORT OF A CASE.

By RANDOLPH LYONS, M. D., of New Orleans,

Instructor in Clinical Medicine, Tulane University of Louisiana.

A review of the literature in 1901 by Packard, Steele and Kirkbride[1] showed 67 well-authenticated cases of Paget's disease including their own. Since this time sporadic cases have been reported throughout the world. Elsner,[2] in 1910, found that including his 2 cases, there were at least 100 on record, assuming Clopton's[3] figures in 1906 to be correct. Although the case to be reported is a typical one of osteitis deformans, the comparative rarity of the disease and the fact that the case exhibits certain interesting features have prompted me to put it on record.

J. H., white, male, aged sixty-one. Widower. Occupation, bricklayer. Home, Morgan City. Admitted to my ward in Charity Hospital, August 29th, 1910.

Family History.—Father died at seventy-nine years of unknown cause. Patient is ignorant of cause of mother's death, but states that she died at the age of forty, having been in poor health since his birth seven years previous. Patient has no brothers or sisters. Has no knowledge of any deformities, rheumatism or cancer in the family.

Past History.—Patient was a sickly child up to three years of age and until that time had been unable to walk; thereafter he enjoyed good health, except for the ordinary ills of childhood. Patient married at twenty-five and had ten children, three of whom are living and well. His memory is uncertain as to the cause of the death of his seven children; however, he affirms they all died in infancy and that diphtheria was responsible for four of them. His wife had one miscarriage. At forty-one patient had pneumonia followed by malaria.

Habits.—Drinks and smokes in moderation. Absolutely denies all venereal infections.

Present Illness.—Began about thirty years ago when he was thirty-one years old. He noticed when plying his trade (bricklayer) that he experienced some difficulty or awkwardness in stepping up, especially if he carried any weight. A year or so later he began to note slight difficulty in walking and found that his ankles turned easily and occasionally gave way with him. He also suffered slight "rheumatic pains" in them. Soon after this he discovered that he was becoming somewhat bowlegged. About four or five years after the onset of the disease his attention was directed to his head; he found that this was apparently growing larger, for his hat which was size 6⅞ no longer fit him. He now complained,

at times, of pains in his head, which, starting at about the zygomatic arch, seemed to shoot up to the top of his head. Patient stated that he had never before suffered with headache. The bones of his legs also began to ache frequently, the ankles in particular. The pain was dull in character but sometimes shooting. These symptoms have continued with but slight aggravation. His deformities have slowly, but gradually, increased with years. Walking became more difficult as he had to keep his legs

Fig. 1.—Illustration of patient in natural posture. Note large head, flaring pelvis and curvature of legs.

far apart, and this caused him to use a cane. He noticed that his stature was smaller and head larger—could scarcely wear a 7½ hat. During the past year he has not felt as strong as formerly, becoming easily tired and short of breath. About May 1st, 1910, he suffered with pains in the lower part of his abdomen and a diarrhea which lasted four weeks. Immediately following this both legs became swollen, tender and pitted.

Patient was confined to his bed. The swelling diminished in a few weeks, but the ankles remained swollen until a week or two before admission (August 29th, 1910).

Physical Examination.—Patient is a man of sixty-one years, under medium height, moderately humpbacked, with a remarkably large, broad head, out of proportion to the size of his face. His superciliary ridges are prominent and his eyes appear deep-set in their orbits. Complexion, sallow and dry; hair, sparse in frontal area. Features apparently normal in size. Expression senile and slightly dull.

The patient's head has a peculiar shape due to enlargement of the bones of the calvarium. The occipital protuberance is very prominent. This hypertrophy of the cranial bones causes the face to appear undeveloped—the so-called "pear-head."

The temporal arteries are visible and tortuous. Mucous membrane somewhat pale. Tongue, clean. Lower jaw contains but a few teeth. Pyorrhea alveolaris marked. Neck is inclined forward and appears short and sunken. Patient when stripped is seen to be emaciated. Skin loose and dry. Muscles flabby, especially in lower extremity. Subcutaneous fat practically lacking.

When patient stands naturally, his head is held forward and downward. There exists a moderate dorsal kyphosis. His chest looks as if it had sunken into his pelvis, the distance between the costal margins and crests of the ilia being noticeably shortened (5 cm.). His arms appear very long, the finger tips just reaching the upper edge of patella and his elbows fall back of the pelvis.

The abdomen is pendulous and bulges in hypogastric region. The pelvis gives the effect of having been flattened out. It is broad and capacious and the bones are thickened, especially the iliac crests which flare out beyond the level of the trochanters.

The lower extremities are bowed. Deformity is marked by double curvature. The bones are bent with an anterior convexity and an outward concavity. His toes turn out. When the heels are brought together he cannot bring his knees in contact with one another and both knees are slightly bent. His thighs are rotated outward and the lower extremities seem large in proportion to the trunk. The bones are almost symmetrically enlarged and arched, except that the right tibia is somewhat more bowed and thickened than the left. Feet are apparently uninvolved.

Thorax.—This is narrow, becoming slightly larger at base. Ribs are moderately flattened out and are closely approximated. Chest wall expands but little on very deep respiration, owing to more or less ankylosis of ribs. Manubrium sternum and first and second costosternal articulations are enlarged. Clavicles prominent.

Spine.—Shows a moderate dorsal kyphosis with rigidity. Backward extension of neck very limited.

Upper Extremities.—The arms, except for their appearance of disproportionate length, are apparently unaffected. Hands show nothing abnormal.

Joints.—In the upper extremities the joints are unaffected; in the lower extremities the joints are involved to a moderate degree, particularly the ankles. The impairment of function in these joints is chiefly mechanical from deformity of the bones.

<div align="center">MENSURATION OF PATIENT.</div>

Cranium:	Horizontal circumference (maximum)	60	cm.
	Occipitofrontal diameter	20	cm.
	Occipitomental diameter	22	cm.
	Biparietal diameter	17	cm.
	Suboccipito-bregmatic diameter	19	cm.
	Bitemporal diameter	17	cm.
	Frontomental diameter	17	cm.
Thorax:	Circumference; midaxilla	77.5	cm.
	Circumference; ensiform sternum	78	cm.
	Total length of sternum	22	cm.
Pelvis:	Intercristal diameter	31	cm.
	Interspinous diameter	27.5	cm.
	Conjugate diameter	19.5	cm.
	Oblique diameter	23	cm.
	Bisischial diameter	6	cm.
	Circumference of pelvis	80.5	cm.
Upper extremities:	Length of right arm	59.5	cm.
	Length of left arm	59.5	cm.
	Grand expansion of arms	140	cm.
Lower extremities:	Right leg, total length	90	cm.
	Femur, upper third, diameter (with pelvimeter)	6	cm.
	Middle third	5.5	cm.
	Lower third	6	cm.
	Tibia, middle	5	cm.
	Left leg, total length	89.5	cm.
	Femur, upper third, diameter	6	cm.
	Middle third	5.5	cm.
	Lower third	6	cm.
	Tibia, middle	4.5	cm.

Height of Patient.—5 feet 2¾ inches. Height before onset of disease, 5 feet 6¾ inches, showing a loss of four inches in stature.

Visceral Examination.—Lungs: respiration almost entirely diaphragmatic. Movement of chest scarcely perceptible owing to partial ankylosis of ribs. Litten's sign very marked and on deep breathing excursion of the diaphragm (as measured by shadow) was found to be 7 cm. Lungs otherwise negative.

Circulatory System.—Visible pulsation in fifth intercostal space, nipple line (10½ cm. from median line). Visible pulsation in neck, synchronous with carotids. No thrills. Cardiac dullness not increased to right of sternum; to left dullness extends:—

11   cm. from midsternal line in fifth intercostal space,
10½ cm. from midsternal line in fourth intercostal space,
 9   cm. from midsternal line in third intercostal space,
 5   cm. from midsternal line in second intercostal space.

On auscultation first sound is followed by short systolic murmur, transmitted only slightly towards left axilla. Second sound clear. Aortic second sound accentuated. Pulse 80, regular, fair volume. Radial arteries tortuous and extremely sclerotic. Blood-pressure 120. (Riva-Rocci) equal in both arms. Brachials sclerotic. Temporals tortuous and sclerotic. Slight arcus senilis.

Abdomen.—Slightly tender on palpation. Skin of abdomen voluminous. Upper half is depressed, while lower portion is prominent. The abdomen looks as though it were separated into two parts by a horizontal band or sulcus, 2½ cm. above level of umbilicus.

Liver in dorsal decubitus, on percussion upper border at upper edge of sixth rib, lower palpable one finger's breadth below costal margin; the edge is sharp and the notch is easily felt. Liver dullness 14 cm. in nipple line.

Spleen and kidneys not palpable.

Vesical and anal sphincters normal.

Genital organs show nothing abnormal (sexual power good up to one year ago).

Glands.—Thyroid gland not palpable, apparently some atrophy. Other glands not palpable except in inguinal regions where they are slightly enlarged.

RADIOLOGICAL EXAMINATION.

(Report by Dr. Adolph Henriques.) 1. The head shows excessive thickening of the cranium. The bones being at least twice as thick as the normal. The inner plate of the skull is dense, but the greater thickening is found in the outer table in which occur well-marked areas of osteoporosis. The cavities of the face show no appreciable diminution in size. The bones of the face are not enlarged; on the contrary, the inferior maxilla presents some general atrophy (due to patient's age).

2. There is no enlargement of the five upper cervical vertebræ.

3. The femur shows marked enlargement and outward curvature. The cortex is thickened, more marked along the inner border.

The medullary canal is dilated, with progressive dilatation from above downward, with corresponding decrease of thickness of the cortex. The articular surface of the femur (with tibia) shows very little change.

4. The tibia is enlarged, curves anteriorly, cortex, both anteriorly and posteriorly being thickened; that anteriorly exhibiting the greater degree of thickening. Areas of osteosclerosis and osteoporosis are well marked along the upper two-thirds of the bone. The head of the tibia shows some flattening at knee-joint when viewed antero-posteriorly.

5. The fibula is enlarged, but this is not as marked relatively as the tibia. The cortex of the fibula is thin, most of its increased size being occupied by the medullary canal.

6. Posterior tibial and peroneal arteries can be seen in their course down the leg. They show unmistakable evidences of arteriosclerosis.

Examination of the Nervous System.—Pupils, small, equal, round, react to light and accommodation.

Patella and ankle jerk very much diminished.

Plantar reflex, normal. Cremasteric reflex, absent. Epigastric and hypogastric reflexes, normal. Deep reflexes in upper extremity, normal.

Muscular power in arms and hands, fair, but universally diminished in legs and feet. Muscular sense fair. No tremors.

Myoidematous nodules form upon striking with fleximeter. Tenderness (slight) along bones of lower extremities.

Sensation not materially altered.

Mental Condition.—Patient unintelligent. Slight retardation of mental processes.

Clinical Examination.—Urine: total quantity 1,100 c.cm. Clear, yellow, reaction, acid. Spec. grav. 1018. Sugar, negative. Albumin, slight trace. Indican, trace. Sediment, slight. Few hyaline and granular casts. Many leucocytes; mucus, urates and a few epithelial cells.

Many subsequent examinations of the urine have given practically the same findings, except occasionally no albumin or casts were found.

Blood.—September 15th, 1910. Red blood-cells, 4,012,000; hemoglobin, 75 per cent.

Color index, .93; white blood-cells, 5,700.

Differential Count:—

Poly	55	per cent.
Sm. Lym.	34.5	per cent.
L. Lym.	8	per cent.
Eosin.	2.5	per cent.

No nucleated red cells.

October 15th, 1910. Red blood-cells, 4,296,000; white blood-cells, 5,675; hemoglobin, 75 per cent.; color index, .89.

Differential Count:—

Poly	50	per cent.
Sm. Lym.	36	per cent.
L. Lym.	7	per cent.
Trans.	6.5	per cent.
Eosin.	0	per cent.
Mast-cells.	0.5	per cent.

200 cells counted.

October 30th, 1910.

Differential Count:—

Poly.	66 per cent.
Sm. Lym.	20 per cent.
L. Lym.	6 per cent.
Trans.	5 per cent.
Eosin.	2 per cent.
Mast-cells.	1 per cent.

300 cells counted.

Wassermann's Reaction, Negative.

Blood-Pressure (Riva-Rocci):—

September 15th.	120
October 5th.	120
October 18th.	125
November 1st.	120

Examination of Stool.—Watery, brownish color; contains undigested meat fibres and vegetable cells. No blood or pus. No ova or amebæ found.

Course and Treatment.—Patient was under observation for eighty-four days. On admission he was put to bed on account of his diarrhea—given liquid diet, chalk mixture (one-half ounce) three times a day. His bowels improved and at the end of a week he was allowed to get up and was put on potassium iodide in increasing doses, three times a day and tr. nuc. vom., drops 15 three times a day. On September 19th the patient was receiving 60 gr. potassium iodide daily, but medication was discontinued on account of another attack of diarrhea. At this time the patient complained of soreness in his bones when tapped, especially in the head and lower extremities. He walked with a cane and complained of pain in his ankles when on his feet for any length of time. His bowels continued loose for two weeks, gradually improving. On October 12th he was given small doses of thyroid extract (1 gr. three times a day). This treatment had to be discontinued again on October 27th, for the patient's stools were again more frequent. No parasites or ova were found in the stools. On November 19th mixed treatment was instituted: protiodide of mercury, one-quarter grain, three times a day and potassium iodide in increasing doses. This line of medication continued until the patient left the hospital on December 21st, 1910. He was taking at that time 90 grains of potassium iodide daily. The treatment of the case did not produce any apparent benefit.

Summary.—Certain points in the history of the case are of interest:—The remarkable slowness of the course of the disease and its long duration without extreme deformity. The patient first began to suffer from the disease thirty years ago. In the majority of cases published, the evolution of the disease is completed in sixteen to seventeen years, and frequently in less time. Moizard and Bourges report a case whose

age when seen was seventy-three. The onset of the disease occurred when the patient was twenty-one. This is, however, very unusual.

The duration of the disease must of necessity be difficult to determine as it is insidious and in many instances the patients are unable to give any definite time of onset.

Etiology.—The cause of Paget's disease is still obscure. Eight years ago the French School under Lannelongue,[4] Fournier and others attempted to place the blame upon syphilis and called the disease a manifestation of tardy, hereditary lues. The majority of later observers have not agreed to this as the etiological factor of the disease.

Legros and Leri,[5] in a careful radiological comparative study of the bones in osteitis deformans, hereditary syphilis and osteomalacia, consider their work unfavorable to the theory of ultra-tardy hereditary syphilis, though not conclusive. Since the advent of the Wassermann test, there have been but a few cases of Paget's disease reported, and it is interesting to note that the Wassermann reaction in this case was negative. Von Kutscha[6] in 1909 reported 3 cases of Paget's disease. The Wassermann reaction was negative in two of them. The third case would not permit the test to be made. The following year Catola[7] reported a case of Paget's disease with a negative Wassermann. The diagnosis in this case might, however, be questioned, as the disease was limited to the head, lower jaw and upper part of sternum.

Therapeutic tests of mercury and the iodides have been of no benefit in uncomplicated cases of osteitis deformans. The etiology is yet to be discovered. It can be stated that the Wassermann reactions, thus far, have at least eliminated syphilis as a factor in the causation of the disease.

In concluding, I desire to express my thanks to Dr. Adolph Henriques for his radiological study of the case, and to J. A. Maxell, interne, for assistance in working up the case.

BIBLIOGRAPHY.

1 Packard, Steele and Kirkbridge (*Amer. Journ. of Med. Sciences*, November, 1901).

2 Elsner: Osteitis Deformans. (*New York State Journ. of Med.*, June, 1910.)

3 Clopton (*Interstate Med. Journ.*, Vol. XIII, p. 223, 1906).

4 Lannelongue: Retarded Hereditary Osseous Syphilis (Paget Type). (*Annal. de Chir. et d'Orthoped.*, No. 4, April, 1903.)

5 Legros and Leri: A Comparative Radiographic Study of Some Dystrophic Affections. (*Société de neurolgie de Paris*, November 5th, 1908.)

6 Von Kutscha: Contribution to the Literature of Osteitis Deformans (Paget). (*Archiv, fuer Klin. Chirurgie*, LXXXIX, pp. 758-781, 1909.)

7 Catola: A Case of Paget's Disease. (*Nouvelle Iconographie de la Salpétrière*, No. 3, May and June, 1910.)

DIVISION OF THE AUDITORY NERVE FOR PERSISTENT TINNITUS; OPERATION; RECOVERY; REPORT OF CASE.

By Edward Bradford Dench, M. D., of New York.

While tinnitus aurium is recognized as an exceedingly distressing symptom, it is usually controlled sufficiently either by local measures directed to the middle ear or by general medication having for its object a sedative effect upon the general sensorium. It is only in rare instances that tinnitus is so severe as to require major surgical interference. In certain of these cases, however, the tinnitus is so distressing that the patient becomes a complete nervous wreck. Some of these cases threaten suicide, and a great number of them meet the surgeon with the statement that they would gladly become deaf, and even jeopardize their lives, were opportunity given them of escaping this constant subjective noise.

In the same category may be mentioned cases of severe pain referable to the region of the ear, in which a careful examination shows that the pain is not due to any inflammatory process, and where further investigation reveals no reflex cause for the symptom of pain. This latter class of cases has been studied in detail by Dr. J. Ramsay Hunt (*Journal of Nervous and Mental Diseases*, February, 1907; *Archives of Otology*, Vol. 36, No. 4, 1907; *Journal of Nervous and Mental Diseases*, Vol. 36, No. VI, June, 1909.) Dr. Hunt has presented, in these several articles, a complete resumé of the literature on this subject, and has been able to formulate very clearly a distinct type of cases of neuritis of the seventh and eighth nerves. Cases of this character come under the same class as cases of persistent and unrelievable tinnitus, and are amenable to the same general plan of surgical treatment. It is to be understood that surgical interference, in these cases, is to be instituted only as a method of last resort. The operation instituted for the relief of the distressing symptom, is one of great gravity, and no surgeon would feel justified in suggesting it to a patient until every other means of relief had been exhausted. In the case which I am about to report, the tinnitus was sufficiently distressing to warrant surgical interference.

The patient was a man, forty-two years of age, who presented with the following history: Four years before he came under my observation, he became suddenly deaf in the right ear. The sudden loss of hearing was accompanied by severe headache, tinnitus, vertigo, and vomiting. In this case there was a possible specific history, and the patient had been treated with antispecific remedies without any amelioration of the aural symptoms. About two months before I saw the patient, he began to have slight

subjective noises in the left ear. Examination of the patient revealed practically absolute deafness upon the right side, both to voice and to sharp sounds. The upper-tone limit, upon the right, was 7 Galton, the lower-tone limit, 512 double vibrations per second. The hearing for the voice and for musical notes, upon the left side, was normal. In walking backward or forward, with the eyes closed, the patient fell toward the affected or right side. Bone conduction was absent upon the affected side, but normal upon the left side. There was no spontaneous nystagmus. Rotation tests showed both labyrinths equally irritable. Electrical stimulation showed a slight hyperesthesia of each auditory nerve,—that is, nystagmus was produced with 3 milliampères of current upon each side.

The patient's general condition was distressing in the highest degree. He was lachrymose, and complained of the severe tinnitus in the right ear, which he said prevented him from thinking of anything else. He was referred to me by an eminent neurologist of New York, who attributed the general neurotic condition, from which the patient was suffering, to the tinnitus. As constitutional treatment had failed to relieve the patient in any way, and as he insisted upon something being done to relieve the persistent tinnitus, I consented to make the attempt to divide the auditory nerve upon the affected side for the relief of the distressing tinnitus. The operation was performed in the following manner:—

The patient was placed, face downward, upon the operating table, the head being supported by a proper rest. The shoulders were elevated so that the neck was fully flexed. A free access was obtained therefore, to the posterior cervical and occipital regions on both sides. The entire head had been shaved the day before the operation, and the field of operation rendered thoroughly sterile. The operation was begun by making an incision from just below the spine of the second cervical vertebra, vertically upward and a little to the left of the median line, to a point just above the occipital protuberance. From this point the incision was carried horizontally outward to a point vertically above the emergence of the mastoid emissary vein. From its outer extremity the incision was continued vertically downward to just below the tip of the right mastoid process. In this incision the skin and superficial fascia were divided. Pressure along the margins of the incision by the fingers of assistants controlled hemorrhage until the tegumentary flap was rapidly reflected downward. All bleeding points in the cutaneous flap were then seized by artery clamps, and hemorrhage, which was rather free, was controlled. The deeper structures along the line of the cutaneous incision were then divided down to the bone; in other words, the underlying muscular tissue and periosteum were reflected downward in the same manner as the cutaneous flap, all hemorrhage being controlled as completely as possible by means of the hemostatic forceps. In this way, the bone covering the right cerebellar hemisphere was completely exposed. As the deeper structures were divided severe hemorrhage occurred from the mastoid

emissary vein. It is sometimes possible to avoid this vessel, but it is most frequently divided in these operations. Hemorrhage from the mastoid emissary was controlled by plugging the mastoid foramen with a bit of sterile wood. The next step was the exposure of the cerebellar dura. The cranial cavity was opened by means of a large gouge. A single stroke of the mallet is enough to expose a considerable area of the cerebellar dura if the gouge is applied just below the superior curved line of the occipital bone. The bony opening was then enlarged in every direction by means of the rongeur forceps until the cerebellar dura of the right hemisphere was uncovered throughout its entire extent; that is, the bone was removed to a point just beyond the occipital sinuses in the median line. Upward the bone was removed along the line of the lateral sinus, below to just the margin of the foramen magnum, and outward as far as the margin of the sigmoid sinus. The lateral sinus, the sigmoid sinus and the occipital sinus are all so firmly lodged in their respective grooves that the palpating finger or the grooved director, introduced between the bone and the dura, recognizes the line of attachment of these sinuses, and thus guides the surgeon as to the amount of bone to be removed. It is necessary to expose the dura, over the affected side, throughout the entire extent of the cerebellar hemisphere. After the cerebellar dura had been exposed in this manner, all bleeding vessels were tied with catgut ligatures, the muscular flap was sutured in place with buried catgut sutures, the cutaneous flap replaced and held in position by means of interrupted sutures of silkworm gut, and a large antiseptic dressing was applied, and the patient returned to bed. Aside from an abrupt rise of temperature to 102° F. on the day following this operation, the patient displayed no untoward symptoms. Immediately after this exposure of the dura, the patient was given urotropine, in doses of 15 grains, four times daily.

The preliminary operation was entirely successful, and one week after the above operation, the operation for division of the auditory nerve trunk was performed. The cutaneous and muscular flaps were reflected and a dural flap formed by incising the cerebellar dura in the line of cutaneous incision just within the margins of the occipital, lateral and sigmoid sinuses, the flap thus formed being reflected downward. Large dural vessels crossing the flap, were divided between two ligatures prior to incision of the dura, in order to prevent hemorrhage. As the dural flap was reflected downward the cerebellar hemisphere was exposed. A thin, flexible, silver retractor, about three-quarters of an inch wide, was then carefully introduced between the cerebellar lobe and the underlying bone. The cerebellar hemisphere was drawn toward the median line, and was, at the same time, lifted upward and displaced slightly outward from the cranial cavity. The cerebellar vessels were extremely full and slight hemorrhage from these thin-walled vessels occurred. This was controlled by applying small bits of sterile cotton to the bleeding

points. Further hemorrhage was controlled by the free use of a solution of adrenalin chloride, 1/3,000, which was applied to the surface of the cerebellum by means of sterile sponges. This absolutely controlled all hemorrhage, and, I believe, aided, in no small degree, in enlarging the field of operation on account of the resultant contraction of the cere-

Fig. 1.—Exposure of the seventh and eighth nerves for division of the eighth nerve in cases of uncontrollable tinnitus. The cerebellum is lifted upward and inward by means of the retractor. The reflected dural flap is well shown.

(a) Common trunk of facial and auditory nerves. The lower portion of the divided trunk represents the auditory nerve, this is to be alone divided in cases of persistent tinnitus. In cases of severe otalgia, the facial and auditory are both to be divided, together with the nerve of Wrisberg. The nerve of Wrisberg is not shown in the drawing, but cannot escape division if both the auditory and facial nerves are severed.

The plate also shows the sixth nerve in front of the combined auditory and facial trunk, and the lateral sinus, close to the margin of the dural incision. (Original dissection by author.)

bellar vessels. At the same time the blood-pressure remained high. Many observers have noted that upon manipulation of the cerebellar hemisphere the blood-pressure falls, and I believe the persistence of a high arterial tension in this case, was due very largely, to the use of adrenalin chloride.

Upon displacement of the cerebellar hemisphere a very free escape of cerebrospinal fluid occurred obscuring the field of operation. The cerebrospinal fluid was rapidly mopped away by means of gauze sponges and by persistent retraction of the cerebellar hemisphere, the nerves at the base of the skull were finally brought into view, illumination of the field of operation being secured by means of the head-mirror and reflected light. The appearance of the parts at this time is very well shown in Fig. 1. The auditory and facial nerves were easily recognized as they emerged from the base of the brain and passed outward to enter the internal auditory meatus. An important guide to the auditory and facial nerves is the auditory artery which runs between the two nerves, and appears as a thin red line in the operative field. In order to prevent the possibility of facial paralysis, a faradic current was then applied to this mixed nerve bundle. One pole of the battery was applied to one of the patient's hands, while the other pole was applied by means of a sterilized electrode directly to the upper of the two nerve trunks,—that is, to the facial trunk. Characteristic facial movements immediately followed. By means of a grooved director the lower of these two trunks, that is the auditory nerve, was separated from the upper or facial trunk, and completely broken up, the central end of the nerve being pulled out from its central attachment by means of the forceps. Stimulation of the remaining trunk still produced facial contraction, showing that the facial nerve remained intact.

The cerebellar hemisphere was then allowed to drop into place, the field of operation was cleansed by irrigation with a warm saline solution, this irrigation having been employed at frequent intervals during the operation, all hemorrhage was controlled by means of ligatures, and the dural flap was stitched in place by means of sutures of very fine silk. The muscular and cutaneous flaps were replaced and held in position by means of sutures similar to those applied in the preliminary operation, and the patient was then returned to bed. Absolutely no reaction followed the second operation, and at the end of three weeks from the time of the first operation, the patient was discharged from the hospital, completely cured, all subjective noises having disappeared upon the affected side. Six months after the operation there was a slight return of the tinnitus upon the right side, probably due to a regeneration of some of the fibres of the auditory nerve. The patient's general neurotic symptoms have greatly improved, and he is in much better condition than before the operation.

The foregoing case is interesting from several points of view: In the first place, the comparatively slight reaction following an operation of such severity, the possibility of dividing the auditory nerve without injury to the facial, and the prompt relief of the subjective symptoms,— are points worthy of notice. I believe that in this instance the internal administration of urotropine was of distinct value in increasing the resistance of the cerebrospinal fluid against infection from without.

In the remarks preliminary to the recital of this case, mention was made of cases of persistent otalgia dependent upon a neuritis of the seventh and eighth nerves. In cases of this character, where pain is the symptom complained of, it is necessary to sacrifice the integrity of the facial nerve in order to relieve the symptom. One operation of this character has been successfully performed by Dr. Alfred S. Taylor (*Journ. Amer. Med. Assoc.*, LIII, pp. 2144-2146, 1909). In this case complete relief was obtained.

In the case operated upon by the author no osteoplastic flap was made, and in operations for exposure of the cerebello-pontine angle, it seems unnesessary to make an osteoplastic flap as the soft tissues are sufficiently thick to afford a complete protection to the exposed brain, even though the bone is completely removed. In Taylor's case an osteoplastic flap was employed, and the result was equally successful. But I hardly think that the formation of an osteoplastic flap is necessary.

While operative interference of this kind is only applicable to cases in which the symptoms are very severe, the absence of any severe reaction following the procedure, would seem to warrant its employment in cases of uncontrollable tinnitus or of severe otalgia, unrelievable by other methods of procedure.

ACUTE POLIOMYELITIS IN IOWA.

By WALTER L. BIERRING, M. D., of Des Moines, Iowa.

While occasional sporadic cases of acute poliomyelitis had been observed in previous years, the first instance of an outbreak suggestive of an epidemic occurred in the summer of 1908, when Doctor McCreary of Whittemore, in the southern part of Kossuth County, reported 9 cases occurring in children ranging from two to twelve years of age, all of which developed during the month of July. This was the only instance of any collected number of cases observed throughout Iowa during that year.

No special focal centres of the disease were reported in 1909, but in the summer of 1910 an epidemic of considerable proportions developed in widely separated sections of the state, reaching a total of 654 cases before dying out in the early winter months. Iowa thus became the fourth largest focal centre for the disease in the United States; Minnesota, Massachusetts and Pennsylvania having a larger number of cases for the same period of time.

A marked diminution in the number of cases is noted during the year 1911, as only 68 cases have been reported to the State Board of Health until December 1st, 1911.

On July 1st, 1911, acute poliomyelitis became a disease reportable by law in Iowa. The Secretary of the State Board of Health, Dr. G. H. Sumner, has prepared a very complete blank pertaining to causative factors, environment, and all the features of the disease; this is sent to physicians on request, to be filled out when a case of acute poliomyelitis is reported, so that, in the future, statistical data will be much more complete and furnish more valuable information than has been possible to obtain heretofore.

While recognizing that a routine inquiry of acute poliomyelitis like the one in Iowa has furnished information peculiar to epidemics elsewhere, yet the study has brought out a number of interesting facts, and these form the basis of this article.

A map has been prepared, which shows the distribution of the disease in 1910 and 1911, the number of cases occurring in each county, being followed by the number of deaths, the population of each county being also given.

The study of the map reveals a widespread and general distribution in 1910 with a tendency to focal occurrence and radiation from these foci. The incidence of the disease suggests the spread along the principal railroad lines traversing the state from east to west, with a predominance

for the northern half of the state, which may be explained by the proximity to Minnesota where the disease has prevailed extensively.

As centres of special prevalence Cerro-Gordo County and Grundy County are particularly noted, 82 cases being reported in the former and 50 cases in the latter. In fifty-two counties the number of cases reported was only five or less. The disease occurred in eighty-five of the ninety-nine counties. The greatest number of the cases occurred during the months of August, September and October, the number of deaths preserving a similar relation.

An interesting fact is noted in comparing the distribution of the disease for the two years of 1910 and 1911: In the areas where the greatest number of cases prevailed during 1910, as in Cerro-Gordo, Grundy, Sioux, Plymouth and Scott Counties, only a few cases have been observed during the present year, two of the above counties mentioned having no cases at all this year.

Attention has been called elsewhere to the tendency of a biennial periodicity of the disease. If such is to be the fate of Iowa another epidemic manifestation is due in 1912.

In regard to the means of spread, the Iowa inquiry has corroborated the transmission from previous cases, although there are frequent instances where it is difficult to trace a connection with former cases, yet sufficient data are easily obtained clearly to demonstrate the infectious and transmissible nature of the disease. The fact, that only a limited number exposed to contact become infected, is shown in this epidemic, as has been observed elsewhere. During the summer of 1910 while the epidemic was at its height in Mason City, the local and State Boards of Health were assisted in their investigation by Dr. Frost of the U. S. P. H. & M. H. Service, and much of the careful data collected were due to the efficient aid furnished through this branch of the government service.

Although children continue to predominate as victims of the disease, a large percentage of cases are encountered in adults, and of the 654 cases reported in 1910, 95 were fifteen years of age and older, 24 of these being over twenty-five years of age. Of the 68 cases reported in 1911, 15 were over fifteen years of age. The sexes were about equally divided. If the mortality can be regarded as an index, the virulence of the epidemic was of rather high degree, as there were 157 deaths in 1910 in 654 cases, and 12 deaths in the 68 cases that have been reported to December 1st, of this year.

The possibility of transmission by means of food and through the medium of dust and insects has been carefully investigated, yet in no way corroborated. The association of cases with the occurrence of paralysis in lower animals is supported by some very suggestive observations, and as an illustration of this point the following instances are submitted.

In October 1910, my colleague, Dr. F. A. Ely, saw in consultation a child with acute poliomyelitis eight miles from Pilot Mound, in Boone County. Upon inquiry it was learned that the nearest town was eight miles distant, that the family had no visitors, the father and mother having been on an occasional visit to Pilot Mound, but no cases of the disease had occurred there.

During the summer many of the chickens on the place had become sick and paralyzed, and as soon as this was noticed, the farmer would snap off the heads and throw the chickens into the hog-yard. Some time later it was noted that a large hog developed a typical paralysis of both hind legs, so that the animal wore the skin off his knees as he dragged himself around. At the time of Dr. Ely's visit another case of paralysis had just been observed in a chicken, and this was taken to Des Moines for further examination.

A similar association between a paralytic disease in chickens and cases of acute poliomyelitis in children was noted in the neighborhood of Pella in Marion County. A number of these chickens were also obtained for further observation and examination. This locality is one hundred and fifty miles distant from the district mentioned in the former instance.

During the epidemic, as it has prevailed in the present year, two more observations were made which are of interest.

In the month of September, 1911, 5 cases of acute poliomyelitis were reported in Calhoun County, three of which proved fatal during the first forty-eight hours. Two of the fatal cases and one of the others were in the same school district, but the remaining two cases were not closely connected in any way.

Upon closer inquiry it was learned that on the farm of each of four of the cases a history of paralytic disease in the lower animals was obtained; in two instances the chickens were affected, kittens at one place, and pigs at the other. The animals in each instance had died or been sacrificed before it was possible to make closer investigation.

The 5 cases are the only instances of acute poliomyelitis in this county for the year 1911, and, since these were reported, no new cases have developed.

Dr. L. E. Noble of Rhodes, Iowa, reported 8 cases of acute poliomyelitis in the month of October, 1911, occurring in the counties of Story and Marshall. The patients ranged in ages from three and a half to twenty years. Accompanying the report was a very instructive map showing the distribution of the 8 cases. Nos. 4, 5, 6, and 7 attended the same school, and thus offered opportunity of contact infection, yet numerous instances of chicken and pig paralysis had been noted in this district during the past summer and also the year previous. Nos. 1, 2, and 3 occurred in a neighborhood by themselves separate from the above, but in which an epidemic of chicken paralysis had been specially prominent during the past summer. The eighth case occurred quite distant from the

others, but on the farm where the child was sick ten pigs had died with a paralytic disease.

Aside from the above instances only five other references are made to a paralytic disease in lower animals in the reports that have come to the office of the State Board of Health, and these were noted in connection with the epidemic in Cerro-Gordo County in 1910. Heretofore the suggestion of an identity between acute poliomyelitis and acute paralytic disease in animals has not been admitted; but, in the few instances, where it has been possible for us to make a careful examination, the identity of the anatomical lesions is clearly established.

In the instance observed by Doctor Ely an affected chicken was obtained in which the illness was acute and not longer than three days' duration, one wing and both legs being paralyzed. The anatomical and histological examinations were conducted by Dr. A. R. Robertson, Pathologist of the Drake University Medical School. Upon exposure of the spinal cord, a distinct area of softened cord one inch in length was observed in the lower dorsal and upper lumbar regions. Histological sections from the affected areas of the cord revealed numerous small hemorrhages in the anterior cornu, and distinct collections of cells in perivascular and pial-lymph channels and tissue spaces of the anterior horns. These infiltrating cells were mostly of the type of endothelial and lymphoid cells. The histological picture was identical with that observed in acute poliomyelitis in the human person. Stained specimens for micro-organisms were negative.

The three chickens obtained in the neighborhood of Pella were kept for two, three and four weeks, until the paralysis and a certain degree of muscular atrophy was well established and then examined. The perivascular cell infiltration was not so marked as in the first chicken, but distinct areas of degeneration were more noticeable in the region of anterior cornual cells.

A great number of culture inoculations were made with negative results, and emulsions of cord substance were injected subdurally into other chickens wihout producing a successful transmission of the disease-process.

While these observations are entirely too few to justify any definite conclusions, yet they are certainly suggestive that a certain identity exists between the two infections, and give rise to the thought that this may be one way in which the disease is kept alive in a community, and constitutes one of the modes of transmission of the disease to the human person.

Types and Diagnostic Features.

During the two years' experience with the disease, Iowa physicians have reported and described examples of all the different types of acute

poliomyelitis that are generally recognized, and these are in accordance with the classification of Wickman:—

1. The ordinary spinal form.

2. Progressive form, usually ascending (Landry's type).

3. Bulbar paralysis, polio-encephalitis of the pons; of the cranial nerves involved, the facial has been most frequently affected.

4. Acute encephalitic type which is very rare.

5. Ataxic (cerebellar) form.

6. The polyneuritic type which is associated with marked pain and tenderness in the extremities; clinically there is no loss of sensation, and post-mortem examinations have failed to reveal a peripheral neuritis.

7. Meningitis type, which may so closely simulate a cerebro-spinal fever that a lumbar puncture will alone allow the differentiation.

8. The abortive forms in which the motor symptoms are slight. Nausea and vomiting associated with diarrhea or constipation are prominent in some cases; pains in the back of the neck or extremities, with hyperesthesia are very common. Four subtypes have been described:—(a) Those with symptoms of general infection; (b) those with symptoms of gastro-enteritis; (c) those with pain and hyperesthesia; (d) those with meningitic symptoms.

In a given epidemic it has been noted that the abortive cases commonly follow one type, the meningitic and neuritic form being the most common. The abortive cases vary in percentage of frequency from 15 to 65 in different epidemics. Dr. Frost considers that, in general, the abortive cases are as frequent, if not more so, than the frank ones, and this proportion as far as careful inquiry can determine seems to have prevailed in Iowa.

The varying symptomatology of this disease is best expressed by Morse:[*] "If we think of the disease as a poliomyeloencephalitis with meningeal complications and appreciate the fact that the disease may affect any or all parts of the gray matter of the central nervous system and in all possible combinations, we shall better understand the innumerable manifestations of the disease and be less likely to overlook it or mistake it for some other condition."

This also clearly presents some of the difficulties in diagnosis.

The period of incubation apparently varies from three to fifteen days. There is nothing about this stage to distinguish it from that of any other infectious disease. Symptoms are commonly absent or so mild as to escape notice, except from close inquiry. Unusual lassitude with a dull headache, nervous irritability, and in a few cases in children a gastro-enteric disturbance of more or less severity, a mild sore throat, and unusual constipation are the common symptoms.
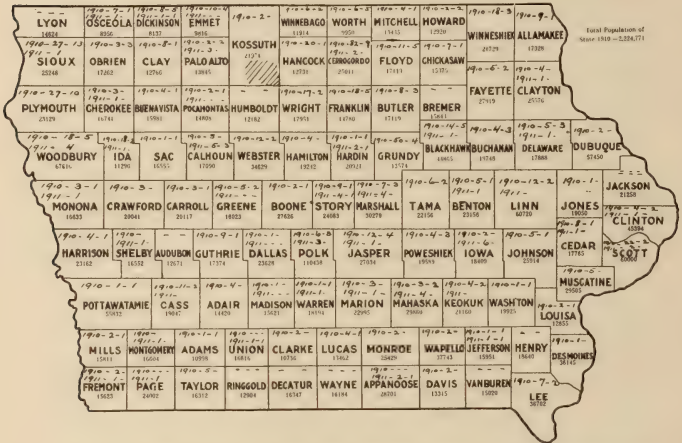
Dr. C. E. Dakin[**] has very carefully analyzed the symptomatology in the preparalytic stage in 75 cases, of which the essential facts will serve well to portray the characters of the disease throughout the state.

The sudden onset is emphasized, being often ushered in by a chill,

not severe in type, or in children especially, by sudden severe vomiting and fever. The onset is often in sleep, the patient waking with high fever and delirium. Pain is a prominent early symptom. It is most characteristic in the back of the head and neck. There is often a distressing ache in the lumbar spine and between the shoulder-blades. Myalgia of the lower limbs, or at times general in its distribution, is frequent. Tenderness is elicited by pressure upon the vertebral spinous processes, most commonly in the cervical region; it may be noticed also on palpating over the posterior nerve-roots, and even in the adjoining muscles. In a few patients there was during the first day or so a marked tenderness about

Map showing distribution of acute poliomyelitis in Iowa, with number of cases and deaths and population in each county.
1910—total number of cases, 654, with 157 deaths.
1911—total number of cases, 68, with 12 deaths.
Shaded area "Kossuth County" indicates small epidemic in 1908.

the umbilicus. Prostration appears early, is extreme in typical cases, and marked in all forms.

The facial expression is regarded as almost characteristic enough to be called pathognomonic. The face appears drawn, the eyes sunken with contracted pupils, staring in an unmistakable unwinking terror. The expression of fear has been noted by the families of the patients in almost every case, and is entirely independent of the psychical state.

The temperature is high at first, but soon drops to an average of 101° F., except in the most severe types. In a large number of patients whose

symptoms were otherwise of a severe type, the temperature remained less than a degree above normal.

The gastro-enteric symptoms were prominent from the beginning in all patients. The tongue is heavily coated and the breath is very foul. Vomiting, in many cases of the projectile type, begins with the onset and is apt to continue for several days.

In the great majority of the patients, constipation of an obstinate type is present from the first. It seems like a paresis of the intestines and distention may be extreme. Bowel movements are exceedingly foul in odor. In a few patients there was diarrhea from the first, and there was noticed in many homes the concurrent diarrheas in other members of the family. Flexner's observation that the virus will not be absorbed from the stomach or intestines during active peristalsis might explain the escape of these exposed persons from the infection.

Spasticity of the flexor muscles especially is noted in practically all severe cases. The resistance to extension of the muscle is marked, but suddenly disappears if the force is continued.

Delirium is common the first night at least, and is often a nightly occurrence even in the absence of fever. Sleep is restless and broken by nightmare, the child often waking with a scream of terror. Muscular twitching during sleep is almost universal, varying from fibrillary twitching to muscle-jerks, which threaten the patient out of bed.

The knee-jerk is at first exaggerated, but inside of forty-eight hours it is greatly reduced or even lost. It is always lost before paralysis of a leg. Ankle clonus and the Babinski sign are not noted. Kernig's sign is usually present, but more often not before the second day. A very characteristic peculiarity is noted in the patients' having stiff neck. If asked to place the chin upon the chest, they would endeavor to do so by opening the mouth and depressing the lower jaw, the neck remaining rigid.

The onset of the paralysis has usually been observed from the second to the tenth day. Patients, who recover without paralysis, usually improve after the fourth or fifth day.

The paralysis may be preceded by a feeling of numbness in the affected region or more frequently by an intermittent neuralgia. This is noticed especially before a paralysis of the leg, the pain being felt in the knee or ankle for a day or so. The numbness precedes paralysis but a few hours. Dr. F. A. Ely has called attention to a preceding clumsiness before the paralysis, and often before the onset of the fever.

The paralysis may be completely established in a few minutes, but more commonly is progressive for a few hours, being fully developed inside of a day. Its occurrence seems to mark a sort of crisis in the disease, as it is coincident with the drop of the pulse and temperature to normal or nearly so. In the fatal cases a fever crisis was not noted with the onset of the paralysis, and this fact became of value in the prognosis;

again, in some cases, the drop in fever occurred several days before the paralysis was visible, and in most of these the paralysis was of a mild type.

In regard to the distribution of the paralysis in adults, a predilection is noted for the proximal group of muscles, as those from the knee to the thigh, and from the elbow to the shoulder. Another interesting fact recognized as peculiar to adult cases, especially as the point cannot be determined in children, is that the bladder disturbance, which is a paretic condition, is always one week in duration and then clears up, which also clearly differentiates it from myelitis.

Improvement in the paralysis may begin within twenty-four hours; in fact, instances were noted where the paralysis did not last over a day. In other cases no improvement is noticed for months.

The newer views, that the condition is essentially an interstitial perivascular exudate with edema, readily afford the explanation as to the retrogression of many apparently severe initial paralyses.

The final outcome of 343 of the 654 cases for 1910 was ascertained, reporting a complete recovery from the paralysis in 131 instances.

In the absence of specific tests, the diagnosis is dependent, especially in the preparalytic stage, on the proper interpretation of certain symptoms which occur often enough to be regarded as cardinal. The various manifestations of the disease, as outlined before, form a symptom-complex which should be easily recognized during the first two days even in the absence of an epidemic.

The value of lumbar puncture at this time as a diagnostic aid is probably considerable. The fluid is under increased tension, the number of cellular elements being very greatly increased. In the very early stages the polymorphonuclear cells predominate; later these are replaced by lymphocytes.

During the presence of poliomyelitis in a community, the fact should be recognized that there are cases having only a few of these symptoms present, and yet so clearly definite as to be very suggestive. These milder cases should be regarded as variations of the epidemic type, and be treated accordingly.

Treatment.

The effective manner, in which the epidemic of acute poliomyelitis was brought under control in Iowa, is a happy illustration of the value of concentrating the attention of the medical profession of the state with the co-operation of an efficient State Board of Health. Interchange of views and experiences, and general distribution of the latest knowledge of the disease, were prominent factors in establishing a logical system of therapy.

In whatever way the transmission of the disease is accomplished, it is a noteworthy fact that in large epidemics, as in Mason City in Cerro-

Gordo County, it subsided in a short time after the establishment of quarantine and the disinfection of all houses known to be contaminated. From experience we are led to regard acute poliomyelitis as an easily transmissible disease, and also that the spread of infection is rather easily controlled, although there is no actual proof that the quarantine ends the epidemic.

The time for the isolation of the patient is placed in the Iowa law at three weeks after the cessation of the fever.

The frequent spraying of the nasopharynx with a 1 per cent. solution of hydrogen peroxide, not only of the patient, but of all who come in contact with him, has been generally adopted,—based on the experimental proof that the nasal mucosa is a pathway of infection and may be infected weeks and months after the subsidence of acute symptoms.

The prevention of constipation seems to have some effect in inducing immunity to the disease, explained probably by the fact that the virus is not absorbed from the stomach and intestines while peristalsis is active.

One of the most important considerations in the treatment of acute poliomyelitis is whether early treatment has any effect in modifying the course of the disease.

In the poliomyelitis experimentally produced in monkeys, the initial implantation of the virus is upon the leptomeninges, and clinical observation tends to confirm this, as the early symptoms are certainly closely allied to those of meningitis.

The virus evidently travels to the spinal cord along the blood-vessels, the parts best supplied suffering most often and most severely. It would seem that if the activity of this circulation could be lessened, the spread of the infection might be affected. The arterial congestion of the cord incident to the initial leptomeningitis is suggested by the exaggerated reflexes and motor excitation, and without doubt this increase in the blood-stream is a factor in the spread of the infectious material.

If this fact is recognized there seems no apparent reason why inflammation should not yield to local depletory measures here as well as elsewhere. Of the several means by which this depletion can be accomplished, a thorough catharsis is the first and most obvious. A clearing of the digestive tract is clearly indicated, and best done with calomel and castor oil.

The initial treament lessens the blood-pressure and aids in the depletion of the spinal-cord circulation, and at the same time prepares the alimentary tract for rapid absorption of the medication to follow. Local counter-irritation may have some effect upon the congestion, and in connection with hot and cold pack should not be neglected.

Of the various drugs advised to reduce the spinal congestion, gelsemium is very highly endorsed by Dr. C. E. Dakin,* as the result of an

---

experience in 20 cases. He gives it in small, but frequent doses, until the physiological effect is produced.

According to Dakin the benefit from the drug is manifest in a few hours, if at all. The motor excitation subsides, the pain almost disappears, and all other symptoms gradually lessen and are gone within two or three days.

Ergot has been applied in a few instances with no special results.

The use of hexamethylenamine has been very extensively used in Iowa, especially during the past year. Its use in experimental poliomyelitis and subsequent demonstration in the spinal fluid afford the unique example of a chemical body being eliminated by way of the cerebrospinal fluid.

It therefore seems a logical remedy to use in acute poliomyelitis, the dose to be from five to fifteen grains every three hours according to the age of the patient, the medication to be instituted at the earliest possible moment.

From a large number of personal communications from physicians throughout the state, I am impressed with the general confidence that is expressed in the efficacy of this remedy, especially when used in the pre-paralytic stage and the abortive type of cases.

Perhaps the most important feature in the treatment of this disease is the recognition that it is an acute infectious process and is to receive the same general care peculiar to all acute infections.

With reference to direct treatment, all authors are agreed as to the therapeutic value of rest, and this applies with equal importance for some time after the acute symptoms have subsided.

While massage and exercise assume an important place in the later treatment, much harm has been done by their being instituted at too early a period. Special supports to the muscles that are antagonistic to those affected by paralysis will prevent contractures and much deformity. Co-operation with a competent orthopedist should be provided early, and careful continued observation of the patient afterwards will do much towards restoring functional ability of the parts involved.

SOME REMARKS ON THE DEFINITION AND SOLUTION OF THE CANCER PROBLEM.*

By Leo Loeb, M. D., of St. Louis.

If one were to inquire of persons in various walks of life, who have given thought to the cancer problem, what this intricate question really means to them, the majority of them would reply that what they really desire is a cure for cancer. This is essentially the true meaning of the cancer problem for the man facing the difficulties and struggles of practical life. A few, perhaps,—the more thoughtful ones,—might add that they also want to know what the cause of cancer is. And these two opinions, it may be stated, are the correct definition of the cancer problem. But the man who actually faces the problem as an investigator recognizes further ramifications of this question; he does not see the problem as a separate entity, but as a part of general biology; hence, with this thought in mind, his contention is that the two important points, the cure and the cause, should be reversed as regards their importance. He would rather say the cause and the cure, not that he underestimates the importance of the cure, being as anxious as anyone can be that a cure should be found; but he knows that both these points of the problem are intimately related to each other, and that if we leave out of consideration the possibility of a happy accident through which we might, so to say, stumble on a cure, the knowledge of a cure depends on a knowledge of the cause. And let me say at once that in our work we must not be guided by the hope of finding a cure accidentally. In the first place, this may never happen, since work done blindly and dependent altogether on accident has results which in the end would be most unprofitable; and, in the second place, a fortunate accident in the shape of a discovery that could not be foreseen, might come to the aid of one who works rationally and scientifically, as well as to one who works less rationally on account of a narrow point of view which takes in mainly the specially practical character of the problem.

The cancer problem is essentially a biological problem. The laws of growth in general, of tissue and cell-proliferation particularly, are among the most essential problems of biology. The cancer problem is the problem of a special kind of growth. We may compare it to a branch of a tree. The tree as a whole represents growth of living substance, of cells and tissues. Various branches represent embryonic, regenerative,

cancerous growth, and so on. Now we wish to know why a certain branch develops on a tree at a certain distance from other branches, why certain peculiarities of its growth exist, depending on a combination of external and internal conditions. Such a problem would include a study and analysis of the conditions under which branches generally develop on such a tree, and a knowledge of the growth of the tree as a whole, always having in mind that we have to apply the information gained to an explanation of the growth of that special branch. At the same time, we would have to investigate with great care all the special conditions under which this branch lives, a study which in itself would, however, not lead to a thorough solution of the problem. In a similar manner we have to proceed in the solution of the cancer problem. We have to investigate with the greatest care the point where this special kind of growth branches off from the main trunk of growth. In order to understand the factors which cause the essential difference between cancerous and other growths, we must compare cancerous growth carefully with normal and certain forms of abnormal growths. And here I may add that the features of normal tissue growth, most important from this point of view, are imperfectly known and need further extensive study. Our work is therefore, of necessity, biological. At the same time we study, of course, the special characteristics of cancer with all the means at our disposal.

In the course of such an analysis we soon recognize that in the case of cancer growth as well as of any other natural phenomenon, there is not one "cause," but there are many causes, or even better, there are many conditions that are responsible. The conception of one "cause" underlying a certain state is deeply rooted, but not justified. Most commonly the "cause" of cancer is supposed to be an organism, and the discovery of this organism is assumed to explain all the pathological changes. Now, in the first place, it is uncertain whether an organism is concerned in the majority of cancers; it is quite probable that organisms are concerned in the growth of certain cancers. In others they may or may not be. But such an organism would represent only one, although I grant a very important one, of the conditions of cancerous growth. An organism would of necessity act through certain chemical and physicochemical means. After the discovery of the organism, the main problem would still remain untouched. What chemical and physicochemical means does this organism employ, and how do such chemical and physicochemical means cause cell proliferation? Perhaps such chemical and physicochemical conditions originate in the body directly under the influence of environmental changes quite independently of an organism, and produce in the cell-mechanism those changes leading to cell multiplication and hypertrophy. A study of chemical and physicochemical conditions leading to abnormal growth-phenomena, resembling in some essential aspects tumor growth, is, therefore, of the utmost value, quite independently of the possible sub-

sequent discovery of an organism. But even granted that an organism exists in all cancers, such an organism could only be one of the "causes" of the tumor. Let us for a moment consider the case of tuberculosis. The tubercle bacillus has now been known for many years, and its discovery was a most important achievement, for which we ought ever to be grateful. But the tubercle bacillus is not the "cause of tuberculosis": it is one of its causes. This is realized by every investigator in the field of infectious diseases. The tubercle bacillus represents a very important external factor in the origin of tuberculosis; but there remain other significant external factors; there remains, furthermore, the sum of the internal factors given in the organization of the individual. The latter are as yet known only in part. Our knowledge of tuberculosis is still incomplete. Although it is sufficient to prevent, therefore, to some extent, tuberculosis, a real cure has not yet been found. This brings us to the second part of our problem,—the cure for cancer!

Now I believe that as far as the therapeutic aspect is concerned, the difference in the present status of cancer is not so very different from that of tuberculosis as some people may believe. We do not know the "cause of cancer," but we have found some of the conditions leading to its development; we know, if we wish to express it that way, some of its causes, and very important ones. And on the basis of this knowledge, the time has come when we can point out some preventive means. We know conditions leading to cancer, just as we do in the case of tuberculosis, although the conditions favoring the development of the disease are in many cases, perhaps, not so easily avoidable in the case of cancer as in the case of tuberculosis. A real cure outside surgical interference, which under certain conditions may help, we possess neither in the case of well-developed tuberculosis nor of further advanced cases of cancer (certain superficial cancers being excepted); tuberculosis having, however, the advantage over cancer that the human organism is naturally more resistant to its progress. In the case of neither of the two diseases can we foresee, with any degree of certainty, when the solution of this part of the problem will be found. In the case of tuberculosis, the insufficient knowledge of the internal factors is the main obstacle to progress. There is no certainty, but a great probability that means will ultimately be found to cure tuberculosis. Biological investigation—past and future —will lead to this solution. We may equally trust that further analysis of the conditions leading to cancer will ultimately lead to a cure for cancer. But we must realize that the solution of the problem of a cure will depend upon the character of cancer. If it should be found that the laws for cancer growth are similar to those governing embryonic and organ growth, the problem of a cure for cancer would be similar to the problem of how to suppress in a living being, by other than surgical means, the growth of an organ like the spleen, for instance, or the development of a limb without injuring the organism as a whole,—a very

difficult problem, indeed. If, on the other hand, we find marked differences in the laws determining the growth of cancer and of normal organs, the solution might be more easily found. We see, then, the solution of this problem—a cure of cancer—is intimately connected with the analysis of the conditions of cancer growth.

That such an analytical study of the conditions of cancer growth and its relation to normal growth has been assiduously carried out in the last ten years, is well known; but, although important results have been achieved, much remains still to be done.

Now let me, in conclusion, briefly state how I believe this work could be done to the greatest advantage. In the first place, our investigations can at the present time be carried out much more successfully in animals than in men. In animals we have a sufficient supply of tumors of a homogeneous character. It is very important not to vary the tumors at the same time with other experimental conditions,—otherwise no definite results can be obtained. Furthermore, only in animals can we experiment with the conditions that may lead to the development of cancer, and analyze the conditions that determine the growth of a spontaneous and of an inoculated tumor. Here we can especially study to much greater advantage the conditions of heredity and immunity. At the present time, therefore, the principal importance has to be attached to the study of animal cancers by all experimental, including biochemical, means. In this connection I would emphasize the special desirability of breeding-establishments for certain animals, as mice and rats, as a part of the research institution, where the animals can be directly observed and the conditions determined under which cancer originates. Such an establishment ought to be near the laboratory and under the direct supervision of the investigators. Co-operation between veterinarians and the investigators is also of great importance. I may here state that from the beginning I emphasized the importance of such co-operation, and at times I received valuable aid from veterinarians. Of equal importance is the study of the reaction of normal tissues to growth stimuli, the production of temporary tumors, and the analysis of the conditions upon which their origin and further fate depend.

In the second place, we have to study patients. We must, however, recognize clearly that from most points of view we cannot expect as far-going and as important information from this department of investigation as from the first. And we must, furthermore, realize that the study of cancer in patients needs the undivided attention, the whole time and best efforts of a staff of investigators. The biochemical investigation of cancer may be advantageously carried out in man. Also, our knowledge of the significance of external and internal factors can be further extended through the careful examination of human cases. If we should find that by certain means animal cancers can be cured, we must examine the efficacy of such a possible remedy in human cases that otherwise

would be hopeless, provided that the patient wishes to avail himself of such a possible chance of a cure. But, I repeat, we must be clear that this study of cancer in human patients requires much time and conscientious labor. It needs men who are able to devote the necessary time to this work. It means, to cite an instance, a very much closer study of the patient than can be done in the ordinary routine examination. The history has to be taken with much greater care. In many cases it will be found desirable to examine, at his former home, the conditions of the life of the patient, to get into communication with his former physicians in order to appreciate the factors that led to the development of the cancer,—factors probably in many cases extending over a period of many years and not appreciated by the patient, and which only an untiring and judicious search, in which each case is regarded as a problem in itself, will discover. On the basis of such work, which to some extent physicians may aid, and for which they may pave the way in their private practice, statistical work should be built up. All the individual work done should be systematically united at a central office of research. I believe that the State Medical Societies could to advantage co-operate in such an undertaking with existing institutions for the study of cancer. I also believe that in connection with this work of the investigator, and materially aiding it, work of an instructive character should be done, aiming at the early recognition and prevention of cancer. I believe that in this case, also, the State Medical Societies should co-operate with special institutions for the study and treatment of cancer.

It is a rather wide program which I have outlined, a program that requires very ample funds for its realization. The field of usefulness of institutions which have such funds at their disposal will be very great, and I believe that this will be more and more realized by the public whose welfare is concerned in this work.

CHYLOTHORAX: REPORT OF A CASE.

By LLEWELLYN SALE, M. D., of St. Louis,
Instructor in Medicine, St. Louis University.

Cases of chylothorax are sufficiently rare to justify their being reported. Handmann, writing in 1899, says, that in two hundred and sixty-one years of medical literature, only 41 cases have been recorded. The etiology of those cases that are not due to trauma is sufficiently obscure to make them of deep interest. Sherman, quoting the "Reference Handbook of Medical Science," gives the etiology in 47 cases as follows:—Injury 16; pressure by new growths or tuberculous lymph nodes 9; thrombosis of left subclavian vein 4; secondary growth in duct 9; perforating lymphangitis 2; aneurysmal-like dilatation of duct 2; thrombosis of duct, operation for removal of carcinomatous lymph glands in neck, mitral disease, filariæ, obstruction to radicles of duct from inflammatory thickening of mesentery, one each. Newman says that chylothorax is most often due to trauma or "to erosion or obstruction of the thoracic duct due to disease"; certainly not a very enlightening statement. Bargebuhr says, that of the 41 cases reported in two hundred and sixty-one years, only 22 can be regarded as certain cases of chylothorax. He gives the etiology in these cases and says that without withdrawal of the fluid the diagnosis has never been made. Hyde reports a case of chylothorax which he believes to have been caused by the rupture of a cystic gland following obstruction of the duct, with subsequent erosion of the pleura. After paracentesis had been performed twenty-one times in this case, the re-accumulation of the fluid ceased after the accidental production of an artificial pneumothorax. Dock reports a case with most interesting blood and autopsy findings. There was a lymphocytoma of the retroperitoneal and mesenteric lymph-glands involving and extending through the receptaculum chyli and the thoracic duct into the left subclavian vein. Hammesfahr discusses the question as to whether or not a perforation of the pleura must precede the formation of a chylothorax . He comes to the conclusion that the intact pleura is permeable for chyle. Wells in his "Chemical Pathology," Lord in Osler's "Modern Medicine," Emerson in his textbook, and many others, discuss chylous fluids and point out the differences between them and chyliform and pseudochylous fluids. Most of them disagree with the dictum of Quincke and Senator that a fluid to be considered truly chylous must contain sugar. The etiology in non-traumatic cases is, as I have said, very obscure and is at best only conjectural. The diagnosis, as to the nature of the fluid, is only made after its withdrawal. In

the absence of a definite etiology, the treatment is symptomatic. The fluid should not be removed until by its bulk it becomes a menace. It is probable that absorption through the pleural surfaces will contribute to the patient's nutrition. Furthermore, it is unwise by removal of the fluid to lower the pressure and so to induce further escape of the chyle from the lymph-vessel. Although recovery has been reported in rare cases, the prognosis is always bad.

The patient, whose case I desire to report, consulted me because of sick-headaches which came on from one to three times each month and were of varying severity. A step-sister has the same sort of sick-headaches and a maternal aunt died of carcinoma. Family history otherwise negative. Patient was always frail as a child but, as far as he knows, had no diseases of any kind. He has never had malaria. He says that his spine has been crooked for many years. He had gonorrhea three years ago, for which he was carefully treated. Denies lues, nor does careful questioning elicit any evidence of a luetic infection. He has always been moderate and regular in all his habits. His home has been in Tennessee, where he was born, and for the last ten years in Arkansas. For the last few years he has been employed in a bank and has had very little out-of-door exercise. The patient complains only of his headaches, which are of several years' standing, and feels that if it were not for them he would be a very well man. At times, patient has palpitation of the heart. He has no cough, or pain in the chest, nor has he ever had. He has lost no weight and has no night-sweats. Thinks he never has any fever. His appetite is small, his bowels are regular, and he sleeps well. He has consulted several physicians during the past few years. A well-known specialist in Chicago told him that he had "stomach trouble" and treated him with lavage. A local physician of prominence saw him two years ago. His findings, which he has been kind enough to communicate to me, were very much the same as mine. There was at that time no pleural effusion, nor was there the difference in the pulses to the noted later.

The patient is a white male, aged thirty-two, five feet, eleven inches in height, and weighs 102½ lb. stripped to the waist. Temperature 98.6° F., pulse 72. He has an abundant crop of black wavy hair; he has no beard on his face. He has a high tenor, almost falsetto voice. The color of the skin and the visible mucous membranes is good. He is thin, but not emaciated, his musculature is poorly developed with thin panniculus. There is a slight disproportion between the bones of the face and the skull, the latter being somewhat large. Eye movements are normal, as are size, shape, and reflexes of the pupils. The mouth and pharynx are negative except for a rather highly arched palate. Small shot-like glands along the posterior border of the sternomastoid. The length of the extremities is not out of proportion, but the fingers are long and tapering. Pubic and axillary hairs are plentiful, but the chest

is as free of hair as a baby's. The chest is long, flat, and narrow; the interspaces are prominent and the costal angle very acute. The right shoulder is higher than the left, and there is a scoliosis involving the dorsal spine in a gentle curve with its convexity to the right. The right side of chest appears slightly fuller than the left. The right side lags slightly on respiration. The apex-beat is weak and is in the sixth interspace well within the mammary line. The relative dullness of the heart begins above, at the upper border of the fourth rib, on the left, one finger's breadth within the mammary line. The right border of relative dullness begins at the right parasternal line. The absolute dullness is slightly smaller than normal and somewhat low. The heart sounds are feeble, but clear; no murmurs are to be heard. The pulses are regular in rate and rhythm, but markedly different in volume. The right radial pulse is of good volume, although the tension is low. The left radial pulse is very small and difficult to feel. The walls of the radials are easily palpable and very hard for one of the patient's age.

When the patient is flat on his back, the lower border of the right lung extends to the upper border of the sixth rib (absolute liver dullness). Litten's shadow on this side is limited. The anterior surfaces of both sides of the chest on percussion yield a clear resonant note. In the axillæ, as far as they can be percussed with the patient recumbent, normal resonance is elicited. When the patient sits up, percussion results are at once different. On the right side, at the level of the third rib, dullness begins, which is continuous below with the liver dullness and extends around to the back in a line almost horizontal. Posteriorly, the lower border of the left lung is on a level with the twelfth dorsal spine, and the excursions of the lung on this side are adequate. On the right side posteriorly, dullness begins at about the sixth dorsal spine. Over the left lung and over the resonant portion of the right, loud vesicular breathing is heard. No râles. Over the dull area there is an absence of breath-sounds and no transmission of the voice. The abdomen is slightly concave, its walls very thin. The liver dullness begins in the mammary line, two fingers' breadth below the costal margin, where its edge can be felt. Its surface is smooth. The spleen is not palpable and percussion over the splenic area yields tympany. The lower border of the stomach, outlined by percussion, extends two fingers' breadth below the umbilicus. Kidneys are not palpable. Pulsating abdominal aorta can easily be felt. There is no tumor or tenderness on pressure. The penis and testicles are no larger than one would expect to find in a boy of seven. There is no scar on the penis. Rectal examination is negative. Ordinary reflexes are normal. Sensation intact. Blood:—Hb—95 per cent., Tallqvist; erythrocytes, 4,900,000; leucocytes, 4,800. Polymorphonuclears 62 per cent., lymphocytes 32 per cent., large mononuclears and transitionals 4 per cent., eosinophiles 1 per cent., mast cells 1 per cent. The red cells were normal in size and shape and contained no organisms. There were

no filariæ. Stools contained no parasites or ova. With the patient prone, the x-ray showed a complete shadow on the right side of the chest. With the patient erect, the shadow corresponded to the dull area described above. On fluoroscopic examination the fluid was seen to be very movable and its upper level remained horizontal as the patient moved from side to side.

On December 16th, 1910, 320 c.cm. of a milky white fluid were removed from the right chest. The fluid was odorless and showed no tendency to coagulate spontaneously. On standing it separated into two layers: an upper white, thick layer and a lower thin, colorless layer. It contained a large amount of albumin which coagulated into curdy masses on heating and acidifying with acetic acid. It contained no copper-reducing substance. On extracting with ether, a thin greenish fluid remained. The ether on evaporation left a fatty, greasy residue on the slide. The fluid was not rich in cells, and those present were without exception of the small lymphocyte type. There were no tubercle bacilli or other organisms to be found. A drop of the fluid under the oil-lens looked like a hanging drop of motile bacteria, a phenomenon which is due to minute fat globules in a state of Brownian motion. Mr. Schakle, of St. Louis University, examined the fluid for me and reported that 91 parts were water, 9 parts solids, of which $1\frac{1}{2}$ parts were fat. The fluid gave the characteristic reactions for fat with osmic acid and scharlach R.

Two days after the removal of the fluid, the patient returned to his home. On the morning that he left a physical examination revealed nothing new. The level of the fluid was, as it had been half an hour after the paracentesis, about one finger's breadth lower than it had been before.

It is unfortunate that no Wassermann reaction was done. During the patient's stay here various circumstances made this impossible. He promised to return shortly for that purpose, but has not done so. I cannot help feeling that there is probably some connection between the accumulation in the chest and the very small pulse on the left side. Two years ago neither of these conditions was present according to the physician who then examined him. They have developed together since then. There may very well be a tumor, e. g., tuberculous or luetic gland, exerting pressure on the left subclavian vessels, diminishing the pulse-wave in the left radial, and at the same time retarding the flow of and damming back the chyle in the thoracic duct. It may be necessary further to assume that the thoracic duct runs upward through the mediastinum to the right of the azygos vein and in close juxtaposition to the right pleura, as indeed sometimes happens. In addition to this interesting and rare condition, the patient was a fairly typical example of that class of individuals whom Strauss describes as presenting the habitus asthenicus or habitus infantilis.

When the patient left here, I wrote to his physician to put him on increasing doses of potassium iodide until he might return to St. Louis.

Although I have not seen him for the last six months, I have heard that he has been gaining weight and is feeling better than he has been in years.

BIBLIOGRAPHY.

Handmann (*Muench. med. Wochenschr.*, XLVI, p. 181, 1899).
Sherman (*Archives of Pediatrics*, XXIV, p. 646, 1907).
Reference Handbook of Medical Science, 1904.
Newman (*Glasgow Med. Journ.*, LIX, p. 117, 1903).
Bargebuhr (*Deutsch. Archiv, fuer Klin. Med.*, XLI, p. 161).
Dock (*Amer. Journ. Med. Sciences*, CXXXLV, p. 634, 1907).
Hammesfahr (*Muench. med. Wochenschr.*, LVI, p. 1876, 1907).
Quincke (*Deutsch. Archiv. fuer Klin. Med.*, XVI, p. 121, 1875).
Fellner (*Mittheil. d. Gesell. fuer Innere Med. und Kinderheilk.*).
Tennings and Rich (*Archives of Pediatrics*, XXV, p. 195, 1907).
Lotheissen (*Wiener klin. Rundschau*, XXI, p. 5, 1907).
Milton (*Brit. Med. Journ.*, No. II, p. 1210, 1907).
Strauss (*Berliner klin. Wochenschr.*, XLVII, p. 5, 1910).
Veiel (*Deutsch. med. Wochenschr.*, XXXII, p. 1359, 1906).

Humboldt Building.

A NOTE ON THE URIC ACID EXCRETION IN MIGRAINE.
(PRELIMINARY REPORT.)

By ALFRED C. CROFTAN, M. D., of Chicago.

So little is known of the etiology of migraine and its pathology that a contribution of any fact relating to this disorder must be welcome.

There is agreement* in this: Migraine is a syndrome of manifold origin, of characteristic though individually varying symptomatology. An hereditary element is apparent in many cases. The symptoms are best explained by vascular spasm with overstimulation of the sensitive area of one or both sides of the brain. The cause of this angiospasm remains uncertain, and there is no evidence of a substantial character to point to the influence of circulating poisons (auto-intoxication). Manifestations of gastro-intestinal disturbances, of hepatic insufficiency, of metabolic derangements, however, so often accompany, precede or follow (?) attacks of hemicrania, or alternate with them, that reasoning from induction and analogy forcibly points in the direction of a self-intoxication becoming operative in a susceptible (heredity, hysteria, etc.) organism.

This contribution concerns itself with a study of the uric acid (plus the purin-xanthin bases, forming about 10/12 per cent. of the total purins) metabolism in 3 cases of typical migraine performed in patients of a high degree of intelligence, whose co-operation was willingly secured to carry out tedious dietary restrictions and to collect a series of twenty-four hours' urines for a considerable period of time.

The results obtained are submitted simply as a chronicle of fact without comment; as an observation and not as an argument. The perversion of the uric acid excretion observed in all '3 cases is presumably a symptom rather than a cause. It demonstrates merely a deep-seated metabolic perversion partaking of the character of a "nucleolytic intoxication" and closely resembling similar conditions observed in gout and in other masked manifestations of the so-called uric acid diathesis.

Enough evidence is presented, in my judgment, to warrant the inclusion of certain forms of migraine of the type herein described among the manifestations of atypical gout, and to indicate an appropriate prophylaxis and therapy accordingly. If it should be found that other migraine

---

*For migraine theories, for historical reviews, for a profuse jumble of evidence in favor of this and that preconceived idea, for an equally profuse jumble of refutatory evidence, for a study of the involved and very voluminous nomenclature, for an occasional kernel of truth and a large mass of untruth, I refer the reader to a library of monographs on the subject of migraine. It would unduly expand the scope of this article to attempt any sifting of this material. Nor would any useful object be attained thereby.

cases do not show similar perversions of the uric acid metabolism, then the uniform findings in these 3 cases suggest a separation of migraine cases at least into two types, this separation being based not upon an apriori reasoning and vague symptomatic evidence, but upon chemical evidence of a positive and readily demonstrable character.

In studying the uric acid excretion, both the endogenous and the exogenous uric acid must be considered. The former is the uric acid manufactured from the degeneration of cell nuclei. It is independent of the intake of uric-acid-forming pabulum and is a biological constant that varies, however, in each individual and must be separately determined in each case. The latter (exogenous) uric acid excretion is a factor of the diet and fluctuates with the amount of uric-acid-forming pabulum that is ingested. As a rule about fifty per cent. of the calculated amount of uric acid is recovered in the urine. For instance, 100 grm. of beef (on account of the purin it contains as nuclein and hypoxanthin) theoretically lead to the formation of 0.18 grm. of uric acid; as a matter of fact only about 0.09 grm. are recovered in the urine. In giving, therefore, 400 grm. of beef, one may normally expect to find $400 \times 0.09 = 0.36$ grm. of endogenous uric acid in the urine.

The endogenous uric acid is determined by placing the patient for several days on a purin-free diet:* after three days practically all of the exogenous uric acid having been excreted, the uric acid of the urine from the fourth day on represents the individual endogenous uric acid excretion (from 0.35 to 0.5 in a normal subject). The exogenous uric acid is determined by adding a definite quantity of purin-containing food to the purin-free diet and determining the increase of the uric acid excretion.

The following table illustrates the findings in the three typical cases of migraine mentioned above. These studies were made in the interim between attacks.

Excretion of Uric Acid.

Day	Diet	Average Normal. (Calculated)	Case I.	Case II.	Case III.
1	Purin-free	0.60	0.53	0.58	0.51
2	Purin-free	0.50	0.40	0.52	0.39
3	Purin-free	0.45	0.36	0.40	0.31
4	Purin-free	0.40	0.34	0.38	0.32
5	400 gr. beef	0.69	0.39	0.49	0.41
6	Purin-free	0.57	0.41	0.43	0.46
7	Purin-free	0.47	0.44	0.40	0.41

The average normal uric acid excretion on the second, third, and fourth days is calculated as follows:—

*For purin-free articles and tables of purin contents of various foods, see, e. g., Croftan: "Clinical Therapeutics," Fourth Edition.

Second day. 0.50
Third day. 0.45
Fourth day. 0.40
                                                                          ———
Total. 1.35
Average for three days. 0.45
(Endogenous uric acid excretion.)

The addition of 400 grm. of beef on the fifth day should cause the excretion of $400 \times 0.09 = 0.36$ grm. of uric acid.

Fifth day. 0.69
Sixth day. 0.57
                                                                          ———
For both days. 1.26
Endogenous excretion on these two days (0.45x2). 0.90
                                                                          ———
Exogenous excretion. 0.36
(Corresponds to theoretical amount.)

This theoretically constructed example, shows that within two days the calculated amount of exogenous uric acid reappeared in the urine. Such close approximations to the theoretical are, of course, rarely witnessed. In Cases I, II, and III, however, will be found deviations from the normal that are excessive and that permit the following two conclusions:—

1. The endogenous uric acid excretion is lower than normal.
2. The excretion of exogenous uric acid is retarded and reduced, indicating chronic retention of uric acid.

Exactly similar perversions of the endogenous and exogenous uric acid excretion are witnessed in gout. In fact, this method of study can and should be utilized in the differentiation of gouty and non-gouty forms of arthritis.

Prophylactically and therapeutically, the use of a purin-free diet (with quantitative regulation, according to the tolerance for uric acid developed in each individual) together with an energetic alkaline-salicylate treatment, is thoroughly indicated in migraine of this type. And I have the impression that in cases so treated the frequency and the severity of the attacks have been reduced. It is too early, however, to make any definite statements.*

Studies of the uric acid excretion in 2 cases of migraine at the termination of the attack show (with due inclusion in the calculation of the individual exogenous uric acid factor) an increased outpouring of uric acid (+ purin bases) scil., a greater excretion of uric acid for two or three days—and this despite the low diet or the starvation at the height of the attack—than was witnessed in the cases studied so far in the interim between attacks. This finding is again quite analogous to the conditions observed in gout.

32 North State Street.

*Full case reports, protocols and analytical data will appear in a more exhaustive report that is to follow this preliminary note.

TWO CASES OF AORTIC ANEURYSM MISTAKEN FOR ASTHMA; ABSENCE OF PULSATION, THRILL AND BRUIT; DIAGNOSIS BY INSPECTION, CONFIRMED BY ROENTGENOGRAM.

By Solomon Solis Cohen, M. D., of Philadelphia.

These cases, one seen in 1909 and the other more recently, will be reported in detail when opportunity serves. The present brief note will suffice to record them. Both patients were syphilitic male laborers in middle life. Both were suddenly attacked with dyspnea, at first, apparently, paroxysmal. Both were sent to the hospital with the diagnosis of asthma. In both the diagnosis of obstructive dyspnea, possibly aneurysmal, was made on sight—and ought to have been so made by an experienced physician.

The patients sat upright in bed, laboring for breath, with marked suprasternal recession, and in the earlier case, supraclavicular recession of the soft parts. There was laryngeal stridor; in the later case, low and expiratory only; in the more severe case, loud and both inspiratory and expiratory. In both, the neck-vessels throbbed violently, and the jugular veins were much distended. In the earlier case there were fits of syncope. Physical examination of the thorax in both cases revealed limited dullness beneath the manubrium sterni; in the earlier case, about the area of a shilling; in the later case, about the area of a silver dollar, and hence extending somewhat to right and left of the bone. In neither case was thrill, bruit or pulsation detected; nor did the laryngoscope reveal anything special. In both cases, the x-ray plate showed a shadow above the heart interpreted as the aneurysmally-dilated arch of the aorta pressing upon the root of the trachea. In the earlier case the shadow was small and circular; in the later case, larger and somewhat pearshaped. The autopsy, showing a sac, little more than an inch in diameter, of which tough clot and the anterior wall of the trachea formed the posterior wall, and which communicated by a small opening with the transverse arch, confirmed the ante-mortem diagnosis in the first case; the second patient is still living.

What makes the cases worthy of record is that sudden dyspnea is the sole symptom; that the ordinary physical signs of aneurysm are wanting; that incidentally to the constant dyspnea, paroxysms of increased distress with wheezing and sonorous and sibilant râles misled practising physicians, outside the hospital, to a diagnosis of asthma; and that the significant features of the cases to the eye and ear of the reporter were the suprasternal recession and stridor—incompatible with asthma and indicative of obstruction in or around the larynx or trachea. In such cases the site and nature of the obstruction remain to be determined by laryngoscopic and other methods of exploration. Even when shown to be outside of the air passages, it is not necessarily an aneurysm. Mediastinal growth or gumma, enlarged bronchial glands, peritracheal abscess, etc., will produce the symptoms of obstruction. The diagnosis of aneurysm must be arrived at by exclusion.

MEDICAL AND SURGICAL PROGRESS.

ORAL HYGIENE.

A PRELIMINARY CONTRIBUTION ON THE CARE OF THE MOUTH.

By Hermann Prinz, M. D., of St. Louis.

The hygienic care of the mouth intends principally to keep the mouth and teeth in a healthy condition. Proper employment of mechanical and chemical means may accomplish this purpose. The mechanical cleansing of the mouth and teeth by means of the toothbrush, toothpick, waxed floss silk, powders and pastes, etc., will always be the fundamental principal of oral hygiene. Mechanical cleansing alone is not sufficient for such purposes, and the additional use of antiseptic solutions is essential if the best results are to be attained. Tooth powders, pastes, and soaps are principally employed for the mechanical cleansing of the accessible surfaces of the teeth. Their antiseptic effect on oral bacteria is of questionable value, as they remain hardly long enough in the mouth to enter into a complete solution. But they are valuable for the removal of adherent masses of bacteria, together with food remnants and slimy adhesions which collect between and upon the teeth, and which form a favorable pabulum for the ready growth of micro-organisms. Mouth-washes are employed for the sole purpose of keeping the continuously insulted oral tissues in a healthy condition. They must favor the recovery of inflamed mucous surfaces which are almost constantly present in a mild degree, and they must be sufficiently antiseptic to inhibit the growth of fission fungi and pathogenic bacteria. A good antiseptic mouth-wash should, according to Roese, possess the following properties:—

1. Absolute indifference in regard to
    (a) the mucous membrane of the mouth—non-caustic,
    (b) the teeth,—non-decalcifying, and
    (c) the organism as a whole—non-poisonous.
2. Sufficient antiseptic action.
3. Good taste and odor.

These various properties are naturally very rarely found in a single combination, and yet each one is of importance. A mouth-wash, which has a disgusting taste, is as ineffective as one which has no germicidal action. The great mass of the public will never be induced to practise oral hygiene that involves an ill-tasting mouth-wash. Absolute safety is of the greatest importance. The value of oral antiseptics is not so great that we are justified in assuming the slightest risk. In general, too little attention has been paid in the past to the deleterious influence of mouth-washes on the mucous membrane. A healthy mucous mem-

brane is the foundation of a successful hygiene of the mouth. The mouth of a healthy person is fairly well protected against the continuous on-slaughts of the omnipresent bacteria, through an unusually large blood supply of the oral tissues, a higher resistance of its epithelial lining, and a continuous flow of saliva. The much-discussed bactericidal action of the last, which is claimed to be due to the presence of small and very variable quantities of potassium sulphocyanide, has been scientifically disproved by the classic researches of Miller and Bruylant. In the normal mouth pathogenic micro-organisms are usually less virulent, and they are the subordinates of the saprophytic germs. Fluegge has shown that the pathogenic bacteria will become extremely active if the individual is afflicted with a slight local disturbance—a simple catarrh of the throat, for instance. Claermont has expressed similar views; and, after a careful study of the fluids of the mouth, he asserts that one is not justified in stating that saliva possesses a definite bactericidal action. It seems, how-ever, that the parotid saliva of man and of some animals (especially the goat) exercises an inhibitory function on certain micro-organisms—the staphylococci and the streptococci. An interesting observation is made by Hodges, who ascertained that sterilized saliva furnishes a suitable pabulum for the luxuriant growth of bacteria, while the normal saliva exercises an inhibitory action on the vitality of the latter. Reasoning on these factors, one is forced to admit that the normal oral secretions possess at least the power of inhibiting to some extent the virulence of pathogenic germs, provided that all the oral tissues are kept in a healthy condition.

In constructing a formula for a mouth preparation the following drugs must be avoided: Alum, charcoal, formaldehyde solution, iron salts, min-eral acids (with the exception of boric acid), mercury salts, potassium salts. salicylic acid and salol, beet and cane sugars, and easily fermentable substances.

The conception, that mouth-washes, tooth powders and pastes, which, in general, are non-poisonous and neutral in reaction are indifferent to the oral tissues, is erroneous. For instance, potassium chlorate has been widely recommended as an oral antiseptic. The pharmacological action of potassium chlorate is erroneously attributed to nascent oxygen, which, it is claimed, is set free after it is absorbed by the tissues. Potassium chlorate has no more value in the oral cavity than an equal amount of sodium chloride, and, besides, it is a specific blood poison. After its ab-sorption into the blood it changes oxyphemoglobin into methemoglobin and produces a multiple destruction of red blood-cells. Clinical observa-tions have further demonstrated the fact that the continuous use of this substance in tooth pastes, aside from its disagreeable salty taste, produces inflamed and easily-bleeding gum margins. The poisonous nature of potassium chlorate is manifested in a number of deaths which have re-sulted from its absorption when applied in solution or in substance on the oral mucous membrane.

Authorities differ widely as regards the ideal antiseptic for the oral cavity. An absolutely indifferent, and yet mild, antiseptic effect is ob-tained from a physiological salt solution heated to body temperature. To sterilize the oral cavity completely, even for only a short time, is quite impossible. If powerful antiseptics are used to accomplish this purpose, the results are distinctly dangerous to the local tissues and to the organism as a whole. Clinical experience, coupled with scientific re-search, points to the fact that a solution of alcohol, hydrogen dioxide,

resorcinol, and zinc chloride in carefully adjusted proportions, with the necessary flavoring agents, not only produces the desired results, but it also conforms to the taste of most patients, and consequently insures continuous use. Chinosol is lauded by some recent writers as a harmless and powerful oral antiseptic; the only objection we have found in its continuous use is the discoloration of metallic fillings. Saccharin, a sulpho-benzoic acid compound, is a very effective oral antiseptic, and is frequently prescribed. Its very persistent sweet taste, when daily experienced, becomes nauseating to many patients, and therefore materially restricts its general use. Miller's krameria-benzoic acid solution is largely prescribed, and deserves to be recommended. The objections made to the use of saccharin and benzoic acid solutions, in regard to their solvent power on enamel, are of little consequence; by actual tests in the mouth, extending over years of daily use, no observable disturbances could be recognized.

Oral antiseptics exercise their beneficial influence on the soft and hard tissues of the oral cavity by inhibiting the activity of the extremely rich saprophytic flora which is always present. The increase of bacteria in the oral cavity is enormous, as the conditions which favorably influence their growth are ideal in this locality. The mere preservation of the teeth and their adnexa is not, however, the only function of the antiseptics, as many other organs which are directly or indirectly connected with the oral cavity proper are frequently subjected to serious pathological alterations, brought about by microbial disturbances, and they are also materially benefited by a strict oral hygiene. Oral sepsis, by way of continuity, may involve the tonsils, the pharynx, the glands of the jaws and the mouth, the stomach, etc. According to Hunter, septic gastritis and toxic neuritis, and their many sequelæ, are the principal disturbances of a general nature brought about by oral sepsis. The local manifestations of oral sepsis vary greatly; they are of an inflammatory and suppurative nature, and may involve the mouth, jaws, and the adjacent parts. The mixed infection of dental caries, as well as the many species of streptococci and staphylococci, are principally held responsible by Hunter as the causative factors of oral sepsis.

A mouth-wash is usually prescribed as a gargle, to be used in conjunction with the tooth brush. The components of the wash should be so adjusted that one teaspoonful mixed with half a tumblerful of warm water (approximately 1 to 30) furnishes the correct proportions of its active ingredients intended for daily use. The gargling motion is produced by forcing air from the lungs through the fluid held posteriorly in the mouth. Powerful exercise of the muscles of the pharynx, the cheeks, and the lips are material adjuncts in forcing the fluid back and forth through the teeth. About one-half to one minute's gargling is the average time required for each mouthful, corresponding approximately to $\frac{1}{2}$ to 1 fluid ounce (15 to 30 c.c.) of liquid. Correct gargling is quite a difficult procedure; it cannot be accomplished by children and those afflicted with pharyngeal disturbances. Through incorrect gargling a quantity of the fluid is usually swallowed, or it merely turns about in the anterior part of the mouth. If the fluids contain alcoholic or volatile solutions, more or less of it is always absorbed.

A suitable mouth-wash, which answers all ordinary purposes, may be prepared as follows:—

Resorcinol. . . . . .ʒi.
Zinc chloride. . . . . .gr. x.
Menthol. . . . . .gr. xx.
Thymol. . . . . .gr. xv.
Oil of Wintergreen, synthetic. . . . . .m. xv.
Alcohol. . . . . .ʒii.
Solution hydrogen dioxide. . . . . .ʒiii.
Water, q. s. . . . . .ʒviii.
Sig.   A teaspoonful in ½ tumblerful of warm water as a mouth-
wash.

In conjunction with the wash, a suitable tooth powder should be em-
ployed.   The following offers a suitable example of such a compound:—

Precipitated calcium carbonate. . . . . .ʒii.
Powdered castile soap. . . . . ʒi.
Oil of peppermint. . . . . .m xx.
Sig.   Tooth powder.

Aside from the care of the teeth by means of washes, powders or pastes,
the mechanical application of the brush, toothpick, floss silk, etc., is
equally important.   Some authors claim that the mechanical procedure
of cleansing the teeth is of far more importance in regard to their preser-
vation than the application of medicinal substances.   Extremists are found
in every walk of life; and, most likely, as in many other things, the solu-
tion of this question may be looked for in applying both principles in
correct proportions.

The selection of a suitable tooth brush requires care.   Some brushes,
as found in the shops, are badly constructed, partly on account of their
shape and partly on account of their mechanical make-up.   The bristles
should be fairly stiff and not too close together.   Each bundle of bristles
should terminate in a pointed cone.   Brushes with large, straight surfaces
and extreme length of bristles should not be used; they do not conform to
the curvature of the dental arches.   The bristles must be carefully mounted
with cement or wire to the bony handle.   Carelessly mounted bristles are
prone to become disengaged from the bundles, and they may lodge in
the soft tissues of the mouth and pharynx, or they may be swallowed
and then give rise to serious disturbances.

Bristles of tooth brushes have lodged in the appendix and have
caused serious complications.   To reach all the accessible surfaces
of the teeth, a tuft of large bristles near the tip of the brush is
essential.   The handle should have a definite curve, so as to make the
use of the brush effective.   The brush should be of medium size.   Brushes,
which are too large, simply fill up the mouth and prevent sufficient free-
dom of action properly to cleanse the teeth.   Most persons are in the
habit of selecting soft brushes, claiming that a stiff brush endangers their
gums and makes them bleed.   In most cases it will be found that the
bleeding is due to accumulations of tartar and to a lost resistance of the
mucous lining of the mouth.   If the gums are in good condition and a
fairly stiff brush is allowed to soak for a few minutes in water, the gums
may be thoroughly brushed with it without causing damage or discomfort.
After using the brush it should be thoroughly washed and a few taps
given on the handle close to the bristles to remove particles of food and
moisture from it.

The correct use of the tooth brush has to be acquired by practice. There are right and wrong ways of brushing the teeth. The object in using the brush is to reach all accessible surfaces of the teeth, and to do this we can do no better than to cite the clear-cut answer of the youngster, who, when asked how he brushed his teeth, recited his last lesson in grammar which dealt with the adverbs of place and motion:—

> "Here, there, yonder, below, in, out,
> Up, down, back, forward, hither, hence."

In brushing the external surfaces of the teeth, the latter should be brought together in the front, and the brush is moved up and down with a slight rotary motion. The mouth is now opened and the grinding surfaces of the bicuspids and molars are brushed from before backward and from left to right. Then the inner surfaces of the teeth are cleansed in the same manner, the brush being held in the whole hand and not between the fingers. The gums, the inner surface of the cheeks and the surface of the tongue should also be lightly brushed. The gums should receive additional attention by lightly massaging with the wet finger tips, employing a rotary movement. This procedure stimulates the tissues, creating an increased influx of nourishing blood in these regions. It is of great importance that while the brushing is going on to have the mouth partially filled with water or the mouth-wash solution, so as to take up immediately the products of the brushing.

To reach the interproximal spaces, toothpicks and floss silk are of great benefit. Toothpicks are made principally of quills, celluloid, bone, tortoise shell, metal, wood, etc. Quill, and, very recently, celluloid toothpicks, are preferable over any other kind. Metal picks especially should be avoided. The wooden picks, unless carefully made and polished, are often injurious to the soft tissues. Small slivers may penetrate between the root of the tooth and the gum and injure the latter. The loss of many teeth have been caused by splinters of wooden toothpicks forcing their way between the teeth. Floss silk and small rubber bands are also extremely serviceable for the removal of food particles and sticky adhesions lodged between the teeth. Waxed floss silk, which is especially intended for dental purposes, may now be obtained from the manufacturers of surgical dressings. This dental floss is wound upon flat metal spools, or preserved in aseptic glass containers, and it deserves to be highly recommended in conjunction with a proper brush and the various mouth cosmetics. Floss silk may be conveniently carried about in the vest pocket. Rubber bands are easily procured, but they are not as cleanly as the dental floss preserved in small vials.

THE ORIGIN OF PROSTATIC HYPERTROPHY.

A REVIEW OF RECENT LITERATURE.

By John R. Caulk, M. D., of the Editorial Staff.

1. Lissauer: Upon the Histology of Prostatic Hypertrophy. (Virchow's *Archives*, Vol. 204, p. 220.)
2. Marion: Observations on the Origin of So-Called Prostatic Hypertrophy. (*Zeitschrift fuer Urologie*, Vol. 5, p. 678.)
3. Marquis: Origin of Hypertrophy of the Prostate. (*Revue de Chirurgie*, Vol. 2, 1910.)
4. Tandler and Zuckerkandl: Anatomic Researches Concerning Prostatic Hypertrophy. (*Folia Urologica*, March, 1911.)

Marion in his article begins by saying that, if one had doubted twenty years ago that prostatic hypertrophy did not start in the prostate, he would have been called crazy. By some, the same statement will hold for the present time. The origin of prostatic hypertrophy has attracted considerable investigation of late, and many of the recent writers conclude that the prostate suffers only a secondary atrophy.

Rokitansky in 1861 stated that, in the course of prostatic hypertrophy, separate bodies develop, which form in the background of the bladder and owe their origin to the urethral glands, independent of the prostate.

Jores in 1894 was the first to call attention that hypertrophy of the middle lobe was not from the intermediary part of the prostate, but from excessively developed glands which lay normally under the urethral mucous membrane between the urethra and the vesical sphincter. In the same year, Aschoff confirmed this idea through research.

Alexander and Ciechanowski in 1898 and 1901, respectively, took this standpoint. In 1902, Albarran and Motz, in their work on the anatomy of prostatic hypertrophy, separated prostatic hypertrophy, in the strict sense, from hypertrophy of the subcervical glands, thus differentiating two types of median lobes.

In 1906, Motz and Pereanau in their revolutionary work stated that prostatic hypertrophy develops at the expense of the central para-urethral glands and the surrounding stroma, and that the prostate took no part except to suffer an atrophy.

Marquis, in his work in 1910, concludes that sometimes, instead of a prostatic hypertrophy, a suburethral or extra-prostatic tumor exists. Marion gives a full anatomical description of the prostate and prostatic urethra, and presents plates showing the glandular arrangement of the peri-urethral glands which are intra-sphincteric and few in number and the large group of extra-sphincteric forming the prostate. The peri-urethral glands are particularly developed on each side of the urethra; posteriorly they are more scarce. He says that it is not surprising that the hypertrophy is considered a tumor of the prostate, as the prostate is the large, important gland in this region and a hypertrophy has the form of the prostate, so that naturally one associates the pathological lobes of prostatic hypertrophy with the anatomical lobes of the normal. The localization in the prostate seemed so certain that it was not doubted.

and no attempt was made to prove it one way or the other. It is claimed that the grounds for another origin of prostatic hypertrophy are numerous.

As to the origin of the middle lobe, Freyer has observed that certain middle lobes seem to come from the lateral lobes, but most observers think that the middle lobe is independent of the lateral. Its development shows its attachment to the urethra, with its origin directly under the mucous membrane. This is the view of Jores, Aschoff, Albarran, Motz and others. Others think that the middle lobe arises from the region of the prostate between the ejaculatory ducts and the urethra. This last is the origin that has been generally held, but Marion says it will not correspond to the facts in every case. The first argument given by some for the non-prostatic origin is of a surgical nature, and is that prostatic hypertrophy has probably nothing to do with the prostate gland, because in the suprapubic operation one has only to cut through the mucous membrane to get to the tumor and not through muscle and mucous membrane, as the case would be if it came from the prostate, and further one can shun ejaculatory ducts and the verumontanum. These points do not seem to prove much, as, in the first place, one removes the adenoma which is enclosed in its capsule, and not the normal elements which have been pushed back; and, secondly, the passage through the complete bladder-wall is not difficult. Another argument given is that the adenoma which makes prostatic hypertrophy is placed above on each side of the urethra in the region of the bladder-neck and is elevated as well in front as behind. Now, the lateral lobes of the prostate are never above a transverse line through the urethra.

Cunio says that if prostatic hypertrophy were truly of prostatic origin, the prostatic urethra must be lengthened its whole course, whereas only the part with the verumontanum is lengthened. Still another point in favor of the non-prostatic origin is the fact that in a few cases one can prove, in the loosening of the hypertrophy, the continuation of the prostate.

Marion cites a case in which he removed the prostate; in a few days the patient died, and both prostatic lobes were found normal. Zuckerkandl claims that the enlargement is due entirely to the middle lobe, and explains the fact above stated by his idea—namely, that the prostatic lateral lobes were left, as they do not take part in the hypertrophy.

Frendenberg, according to Marquis, can determine through palpation, after many prostatectomies, that prostate tissue remained, and he was able to get prostatic secretion by massage. This argument is of no value, because by removing the adenoma we do not remove all the gland, particularly in a conservative perineal prostatectomy. Stress is laid on the capsule surrounding the adenoma, and it is considered a capsule not similar to other adenomatous capsules. It is much stronger and contains numerous muscle fibres, and, when one considers that it is developed posteriorly in the region where the gland tissue is pushed backward, it substantiates this idea.

Advocates of the non-prostatic origin give, as their best argument, the relation of the tumor to the sphincter which is external to it. They conclude that if the tumor were of prostatic origin, it should be external to the sphincter. Marion presents plates demonstrating this relationship.

Lastly, as a proof of the non-prostatic origin, the advocates claim that no traces of urethral glands can be found after the removal of the tumor and that if it were of prostatic origin, the glands should be found.

DYSMENORRHEA.

A REVIEW OF RECENT LITERATURE.

By RANDALL S. TILLES, M. D., of St. Louis.

1. Brettauer: Dysmenorrhea Relieved by Nasal Treatment. (*Amer. Journ. of Obstet.*, p. 214, August, 1911.)

2. Brickner: A Review of 73 Cases of Dudley's Operation for Dysmenorrhea and Sterility. (*Surgery, Gynecol. and Obstet.*, p. 510, November, 1911.)

3. Byford: Treatment of Anteflexion of the Uterus. (*Journ. Amer. Med. Assoc.*, March 11th, 1911.)

4. Carstens: The Stem-Pessary for Dysmenorrhea, Amenorrhea and Sterility. (*Journ. Amer. Med. Assoc.*, p. 1730, November 20th, 1909.)

5. Cotte: Dysmenorrhea of Tuberculous Origin. (Abs. *Amer. Journ. of Obstet.*, p. 532, March, 1910.)

6. Drenkhahn: Atropine in the Treatment of Dysmenorrhea. (Abs. *Journ. Amer. Med. Assoc.*, p. 2278, December 24th, 1910.)

7. Eisenstein and Hollos: Cases of Amenorrhea and Dysmenorrhea Cured by Means of Tuberculin. (*Zentralbl. fuer Gynækol.*, p. 1441, 1908.)

8. Flatau: Treatment of Dysmenorrhea According to Polano. (Abs. *Amer. Journ. of Obstet.*, p. 54, July, 1910.)

9. Gremer: Intrauterine Stem-Pessaries. (*Monatsschr. fuer Geburtsh. und Gynækol.*, Vol. 28, p. 78.)

10. Græfenberg: Dysmenorrhea and Tuberculosis. (Abs. *Journ. of Obstet. British Empire*, p. 434, May, 1910.)

11. Græfenberg: Dysmenorrhea and Tuberculosis. (Abs. *Journ. Amer. Med. Assoc.*, p. 1418, April 23rd, 1910.)

12. Harris: Resection of the Spermatic Plexus for the Relief of Certain forms of Dysmenorrhea. (*Journ. Amer. Med. Assoc.*, p. 1104, April 15th, 1911.)

13. Heaney: Periodic Intermenstrual Pain. (*Surg., Gynecol. and Obstet.*, p. 361, October, 1910.)
Herman: "Dysmenorrhea." (*Brit. Med. Journ.*, p. 1210, October 22nd, 1910.)

14. Kelly: Dysmenorrhea. (*Amer. Journ. of Obstet.*, May, 1910.)

15. Kohnstamm: Hypnotic Treatment of Anomalies of Menstruation. (Abs. *Zentralbl. fuer Gynækol.*, p. 1496, 1908.)

16. Kolischer: A Type of Operative Dysmenorrhea. (*Amer. Journ. of Obstet.*, p. 644, April, 1909.)

17. Kuttner: Nasal Dysmenorrhea. (Abs. *Zentralbl. fuer Innere Med.*, No. 42.)

18. Massey: Dysmenorrhea. (A Textbook of Conservative Gynecol. and Electro-Therapeutics, 4th Ed., p. 99.)

19. Mathes: Etiology and Therapy of Dysmenorrhea. (*Monatsschr. fuer Geburtsh. und Gynækol.*, Vol. 28, p. 73.

20. Norris: Dysmenorrhea. (Abs. *Amer. Journ. of Obstet.*, p. 1075, December, 1908.)

21. Norris and Barnard: Dysmenorrhea in Nulliparous Women Without Gross Local Pathological Lesions. (*Amer. Journ. of Obstet.*, p. 753, May, 1910.)

22. Novak: The Treatment of Dysmenorrhea. (*Zentralbl. fuer Gynækol.*, No. 15, p. 576, 1911.)

23. Pozzi: The Conical Cervix as a Cause of Dysmenorrhea and Sterility. (Abs. *Journ. Amer. Med. Assoc.*, p. 84, January 1st, 1911.)

24. Pozzi: On the Surgical Treatment of a Most Frequent Cause of Dysmenorrhea and Sterility in Women. (*Surg., Gynecol. and Obstet.*, p. 3, August, 1909.)

25. Purefoy: Intermenstrual Pain. (*Journ. of Obstet. British Empire*, p. 216, March, 1909.)

26. Reynolds: Anteflexion of the Cervix and Spasm of the Uterine Ligaments in Relation to Retroversion. Dysmenorrhea and Sterility. (*Surg., Gynecol. and Obstet.*, p. 17, July, 1911.)

27. Sellheim: Dysmenorrhea Due to Stretching of Peritoneal Folds and Adhesions. (*Monatsschr. fuer Geburtsh. und Gynækol.*, Vol. 27, p. 681.)

28. Stœckel: Sacral Anesthesia. (*Zentralbl. fuer Gynækol.*, p. 1, 1909.)

29. Veit: Dysmenorrhea. (*Muench. Med. Wochenschr.*, No. 47, p. 2434, 1908.)

30. Wahrer: Dysmenorrhea and the Popular Errors Concerning It. (*Journ. Amer. Med. Assoc.*, p. 420, July 29th, 1911.)

31. Herman: Dysmenorrhea. (*British Med. Journ.*, p. 1210, October 22nd, 1910.)

Dysmenorrhea with its unvarying symptoms and its constantly varying etiology appears to-day, even in the light of our present extensive investigations, a stumbling-block to innumerable general practitioners and many gynecologists.

It is a condition, the etiological basis of which is so varied, differing so entirely in its pathological groundwork, that the constancy of the clinical manifestations may be said to lie in inverse ratio to its etiological causes.

After perusing the following brief review of the current literature of this subject, one cannot but realize that only after recognition of the real cause can any success at all be hoped for in the matter of securing the satisfactory alleviation of this widespread discomfiture of all women.

It has been estimated that 84 per cent. of women in Germany suffer with pain or disability at the menstrual period, while Engleman finds that 50 to 80 per cent. of all American girls suffer more or less with dysmenorrhea.

Dysmenorrhea signifies painful menstruation and represents neither a disease nor a pathological condition. Yet, for the proper and permanent relief of pain, it becomes at once necessary to determine the pathological condition of the genital organs, whether it be due to malformed or infantile hypoplasia, the direct result of defective development, or the result of some tuberculous process in the pelvic organs during childhood.

Mathes (19) concluded from his observations that he observed dys-

menorrhea in many instances as the one symptom of a general asthenia, usually congenital and associated often with the characteristic symptoms of an enteroptosis; while Pozzi (23), in describing the indications for his cervical-enlarging operation, refers to an infantile type of the internal genitals, consisting essentially in the conical shape of the cervix with an extremely small lumen and exaggerated anteflexion of the uterus, all of which may be encountered in women otherwise well developed and without atrophy of the uterus. The result here is a kinking of the cervix, which causes stagnation of mucus with consequent inflammation which in turn obstructs the lumen still more. In this connection, we have the opposite view of Norris and Barnard (21) in which they emphasize that a stenosis of the cervix alone rarely causes a dysmenorrhea; that it is merely the stenosis plus the excessive clotting properties of the blood which produces the trouble; the most frequent cause of clotting within the uterus being the shreds of endometrium. Herman (31) says dysmenorrhea does not depend upon the size, shape, or position of the uterus, or upon the size of the cervical canal or the os externum. It occurs when the uterine canal is straight as well as when it is bent. The angle in the canal and the dilatation of the uterine canal behind it have never been found to exist in an actual section of the uterus. There are cases in which the os externum was round and so small that an ordinary uterine sound could not be passed through it, but there was no dysmenorrhea. In some of the worst cases the os externum is of ample size, and the sound can be passed easily. He concludes that dysmenorrhea is a spasm or colic of the uterine muscle recurring with each menstruation; that there is an absence of the dilatation or relaxation of the cervix, which ought to accompany contractions of the body, and these contractions are therefore violent and painful. He thinks there is no mechanical hindrance to the flow of blood.

A most striking parallel observation was first noticed by Kolischer (16), for which he ascribes the violent uterine contractions to a peculiar densifying condition of the cervical tissue, the result of previous inflammations and specific venereal infections, or to general infectious diseases when occurring in virgins. This densifying or cicatrization of cervical tissues is readily demonstrated by excising pieces from the cervix, and is described as the "tissue cry" by the Germans.

Still along the lines of the fibromuscular theory we have the excellent work of Reynolds (26), in which he shows that all structures, which support the uterus, are more muscular and less fibrous than commonly supposed; that spasm of these muscular structures plays an important part in the production of the symptomatology of pelvic disorders; that anteflexion of the cervix is arrest of development of the anterior vaginal wall; and he furnishes an explanation of the mechanism by which anteflexion of the cervix produces dysmenorrhea and sterility.

Still advancing along the lines of least resistance, we reach the more fantastic theory of Massey (18), who, after reviewing the causes of pain in menstruation due to a hyperesthesia of the endometrium, recently described by Wylie, offers a better explanation, one that regards dysmenorrhea almost entirely as a neuromuscular phenomenon. The attempt at the performance of an important function, says Massey, while either the nerve centres in the cord or in the uterus itself are in an unprepared condition, results in pain. He offers his percutaneous constant current application for relief. A more promising and lasting result, it is asserted, may be obtained by resorting to the method of Harris (12), who has

operated upon twenty women with gratifying results to the author himself, giving them relief from their menstrual pain by the resection of the nerves which, arising from the renal and spermatic plexuses, supply the ovary. He achieves results only when the pain is ovarian or tubal in origin unaccompanied by pathological conditions within the uterus.

Sellheim's (27) opinion of dysmenorrheic pain, commonly seen in patients suffering from inflammatory conditions of the uterine appendages, is that it is not due so much to the inflammatory process itself as to the pulling of the adhesions and of the peritoneum incident to uterine contractions during menstruation. Kelly (14) gives a slight endocervicitis, non-specific in origin, as a cause; while all important is the communication of Norris and Barnard, previously referred to, they attributing a frequent cause of dysmenorrhea to a chronic appendicitis, a matter which is explained by Peirsol by the close relationship between the meso-appendix and the broad ligament, or by the presence of the appendicular-ovarian ligament, the existence of which was denied by von Rosthorn.

Very closely related to dysmenorrhea, but considered a distinct entity by some authors, we have the interesting condition of *mittelschmerz*, to use a German expression, or intermenstrual pain. This was first described by Priestly who drew attention to the periodical appearance of abdominal pain midway between the menstrual periods. He gives the frequency of this condition as 12 in 2350 gynecological patients. With this condition the menstrual type varies, though it is generally regular with a scantiness of flow, dysmenorrhea occurring frequently, but not so often that it could be considered a constant finding.

Heaney (13), in an analysis of 6 cases with laparotomies, showed that 5 had fibroid uteri, all 6 either sclerotic or cystic degenerated ovaries, and one hydrosalpinx.

Heaney contends that periodical intermenstrual pain is an abortive attempt at menstruation, the pain being a dysmenorrhea, the whole condition depending upon degenerative and sclerotic conditions in the ovaries and uterus. Purefoy (25), in considering the same subject, attributed it to a condition known as hydrosalpinx, since it is often associated with a watery discharge—a leakage from a hydrosalpinx. Ashe thought the condition due to some form of toxemia arising from an excess of internal secretions of the ovary. Fitzgibbon suggested a congestion of the ovary as a cause, and recommended circulatory treatment. Norris attributed it to difficult and painful rupture of the Graafian follicles; while Roux de Brignolles recently called attention to the frequency of this condition with the presence of sclerosis of the ovaries.

Græfenberg (10-11), who first noticed accidentally the relief of menstrual troubles in women while under treatment for tuberculosis by tuberculin, suggested that the defective development of the genital organs was the consequence of some tuberculous process in the pelvic organs during childhood; the menstrual hyperemia thus inducing the pain in the imperfectly developed organs. This work was further investigated by Eisenstein and Hollos (7) who found that 118 women with menstrual trouble reacted to the subcutaneous injection of tuberculin. After a division of dysmenorrhea into primary and secondary forms, Græfenberg concluded that the tuberculin treatment may prove successful when primary dysmenorrhea is accompanied by local reaction to tuberculin. He gives the tuberculin injection twice weekly.

Cotte (5), who considers dysmenorrheic molimen a manifestation of a tuberculous toxemia, shows that of 70 women treated for tuberculosis, all with dysmenorrhea, 40 were entirely cured.

Another method of treatment, and often a successful one, is just as dependent upon the proper diagnosis as the above tuberculin cure. This condition was described in 1897 by Fleiss as nasal dysmenorrhea. He claimed that certain areas in the nasal mucous membrane—the genital spots—had a direct connection by way of the sympathetic system with the genital organs, and he obtained relief for his patients by the application of a 25 per cent. solution of cocaine to the genital spots, and later by cauterization with trichloracetic acid or with the galvano-cautery. Yet Kuttner (17) holds that menthol in the nose or pharynx, or a few drops of cocaine in the mouth, gives at times equally favorable results, and attributes the therapeutic effects often to the psychical influence of the patient either through the general action of the cocaine or through its stimulating effect. Kolischer describes the results due to suggestion in certain hysterical patients, and points out that cocainization of other mucous surfaces produces the same effect. Veit (29), in referring to the work of Fleiss, claims his results favorable only in the nervous form of dysmenorrhea, and says: "Is it because the nose is diseased that the dysmenorrhea exists, or is it because the sexual organs are diseased that the nasal condition exists, or is it that the individual, who is relieved, is from beginning to end a neuropath?"

As regards the operative treatment of dysmenorrhea, which tends to relieve by dilatation or discission of the cervix uteri, many varying forms of operation have been suggested, most of them having in view chiefly the object of overcoming some form of obstructive process, while all of them differ technically as to the performance of the procedure.

Brickner (2), in a recent article, reviews 73 cases treated by the well-known Dudley operation with excellent results. Pozzi (24) outlined well the indication for his procedure as applicable to the common malformations of the cervix of the infantile type, where the cervix is longer in proportion to the length of the corpus uteri, thereby forming a more or less acute angle. He used the technique of making two lateral cervical incisions, and then uniting the internal mucous membrane with the external cervical mucous membrane, thus widening the external os. He claimed excellent results as regards dysmenorrhea, which is immediately and definitely cured.

Norris (20), in a description of membranous dysmenorrhea obtained his best results from a dilatation and curettage followed by the insertion of a Wylie drain, together with tonics and improved hygiene. Carstens (4) advises the introduction of the stem-pessary in those obscure cases in which we cannot say positively what the particular abnormal condition is—the condition formerly called neuralgic. In cases with partial atresia, the first step is forcible dilatation. In this respect may be mentioned Gœmer's (9) satisfactory results from the use of the stem-pessary; a procedure decidedly against the general opinion of the Germans, who are thoroughly opposed to the intra-uterine stem-pessary, and whose text-books contain very strong warnings against its use.

Byford (3), in an article on anteflexion of the uterus, claims good results from introducing a body large enough to overdilate the cervix and often enough to keep it dilated. Wahrer (30), although he also advised that dilatation should be maintained for several months at least, preferably by a canula, asserts that there is in the treatment of dysmenorrhea too great a tendency to dilatation and curettage and to ultra-radical surgical measures, since dilatation cures less than 20 per cent. of all cases on account of contracted cervices being the exception and not the rule.

Among the more unique methods of relief for dysmenorrhea may be mentioned Sellheim's method of massage based on the principle of his peritoneal pull, and on the peritoneal adhesions. He personally designed a method consisting of the introduction of iron rings, balls, or chains introduced into the vagina and intermittently pulled upward by a strong electro-magnet placed over the abdomen. Kohnstamm (15), a neurologist, dwells extensively upon the remarkable effect that can be obtained by means of hypnotism upon normal and abnormal menstruation. Stœckel (28) used an epidural injection through a puncture of the sacral canal, as first employed by the French urologist, Cathelin, and obtained favorable results in 5 cases of essential dysmenorrhea. The Polano treatment is described by Flatau (8) who treated nearly 40 cases of virginal dysmenorrhea by applying cupping glasses, 7 to 8 centimetres in diameter, to the breast for half an hour daily for four to five days before the appearance of the menses. The effect was good in all cases, but of variable degree. Permanent cure is only obtained in exceptional cases.

Chief among the drugs is guaiacum resin, which has been used with excellent results by Herman in doses of 10 grains three times daily beginning a few days before the expected period, so as to overcome the recurrence of the uterine colic. Drenkhahn (6) reports a number of cases of dysmenorrhea in which injection into the cervical canal of 1 mgrm. of atropine dissolved in 1 c.cm. of water arrested at once the colicky spasms in the uterus, or prevented their development. The same effect was also obtained by introducing small cotton wads moistened with 1 per cent. solution of atropine and pressed back against the vault of the vagina. Animal experimentation shows that atropine paralyzes the automatic action of the uterus. Novak (22), following the experiences of Drenkhahn, determined to try the therapeutic effect of atropine in dysmenorrhea through its internal administration, and gave two to three atropine pills of ½ mgrm. each by mouth. With the exception of a dryness in the throat, his results were good.

There are still other suggestions that could be advanced for the relief of this omnipresent condition; but even this cursory review of the etiological factors and the methods of relief must impress the reader with the immense importance of careful and painstaking inquiry into each and every case, so as to ascertain the underlying and hidden causative factors, before the various therapeutic methods and remedies can be intelligently applied. Every case of dysmenorrhea can be cured if but the proper care and intelligent application of the practitioner is combined with the confidence and willingness of his patient.

THE X-RAY IN MALIGNANCY.

By E. H. Skinner, M. D., of the Editorial Staff.

1. Boggs: The Roentgen Treatment of Carcinoma of the Breast.
    (*Amer. Quart. Roentgenology,* Vol. III, No. 1, p. 53, April,
    1911.)
2. Hall-Edwards: Treatment of Cancer by Means of the X-rays
    and Radium. (*Journ. Advanced Therapeutics,* Vol. XXIX, Nos.
    5-7, pp. 218-320.)
3. Johnston: Therapeutic Efficiency of Roentgen Irradiation.
    (*Amer. Quart. Roentgenology,* Vol. III, No. 1, p. 62, April,
    1911.)
4. Judd: The X-ray as a Curative Agent in Malignant Tumors.
    (*Medical Record,* Vol. 80, No. 10, p. 471, September 2nd, 1911.)
5. Leduc: The Roentgen Treatment of Malignant Tumors.
    (*Archives Roent. Ray,* Vol. XVI, No. 5, p. 164, October, 1911.)
6. Morton: The Present Position of the X-ray and Radium Treat-
    ment of Malignant Disease. (*Archives Roent. Ray,* Vol. XVI,
    No. 5, p. 169, October, 1911.)

The future of x-ray therapy in malignancy seems to depend consider-
ably upon the co-operation of the surgeon. Postoperative irradiation,
in spite of the antagonism of a certain type of surgical pessimist, has es-
tablished itself as being of palliative value and, with hesitancy and doubt,
we add curative value. The ante-operative treatment is gaining in favor
among a class of radiotherapists who have had considerable experience
in postoperative therapy, and its future depends upon its use by just
those radiologists who are thoroughly familiar with radiotherapy. The
permanence of any therapeutic measure depends, to a large degree, upon
its application by careful technicians. The too early general acceptance
and pursuit of a new therapy by medical imitators leads many a promis-
ing agent of cure to an early demise.

Up to the present time there is only one type of malignancy upon
which it is generally agreed that the x-ray can safely insure results.
We refer to the epithelioma of the skin attacking that portion of the face
below the eyebrow and above the lips.

Judd claims that about 90 per cent. of these cases, in which the super-
ficial epithelial growth is confined to the surface of the body, i. e., with-
out metastases or glandular involvement, can be cured by the x-ray.
In about 10 per cent. of cases, especially growths in old people with
nests of pearl cells, the x-ray will destroy the growth, but fails to pre-
vent its recurrence. The observations of Judd express the opinion held
by radiologists generally. This one type of malignancy alone seems to
be the limit reached as far as the curative value of the x-ray goes.

The postoperative value of the x-ray in carcinoma of the breast seems
to be confirmed by the numerous reports of conscientious radiotherapists;

and the procedure should no longer be a matter of choice with the patient,
but a demand upon the part of the surgeon. It is always difficult to judge
whether the number of months or years that a patient lives after the
surgical ablation of mammary carcinoma is due to postoperative irradia-
tion or to the completeness of the operation. One cannot easily decide
between the skill and generalship of the surgeon and the exacting tech-
nique of the radiologist.

One thing is certain: the x-ray should never be employed in inoperable
malignancy with an idea of cure. The alleviation of pain may be secured,
but any successful issue should be charged up to coincidence or spon-
taneous disappearance of unknown origin.

Leduc has startled us recently by a most radical advocacy of the x-ray
as a primary curative measure in malignancy. His attitude seems to be
based rather upon the fact that surgical measures are not always sure
of results than upon an improved technique of irradiation based upon
our previous knowledge of the x-ray. His manner of irradiation does
not offer any thing new; rather it is reverting to the cross-fire method
which Freund introduced to avoid dermatitis before the use of filters.
The article is not convincing to one who has seen more or less radio-
therapy.

In speaking of deep-seated carcinoma, the conservatism of Judd is
delightful. He says the use of the x-ray in these cases is justifiable
only in those of thoroughly inoperable character, where the use of the
x-ray alleviates pain, and this occurs in about 80 per cent. of the cases.
Judd believes that we obtain only a stimulating effect of the x-ray in these
inoperable cases, and that death takes place earlier because of the toxemia
and metastasis resulting from the stimulation.

Boggs presents a different view of the use of the x-ray in inoperable
cancer. He says: "The rays are the only therapeutic method in inoper-
able cases that will cause cessation of pain and hemorrhages, disap-
pearance of offensive odors, arrest invading progress and cause improve-
ment in the general health of the patient. In a certain percentage of cases
the mass is reduced to such an extent that it will become operable. It
seems, in the past, that many of these cases which have improved so
much were operated upon too early, before the disease had sufficiently
localized. When a patient presents herself with the symptoms unfavor-
able for operation, the mass breaking down, or about to break down, a
number of intense irradiations should be given, walling off the mass as
completely as possible in order to lessen the chances of further infection."
But Boggs, in his conclusions, says that while his personal experience
would seem to call for the routine ante-operative irradiation of carcinoma
of the breast, our "general experience is not yet sufficient to permit us
to assert this as a demonstrated fact."

All of the articles in this review relate to the value of postoperative
irradiation, with the exception of Leduc's. The removal of the growth
to its widest extent and the immediate use of the x-ray are the means
advocated by the above radiologists and supported by the surgeons with
whom they have collaborated.

PRACTICAL MEMORANDA.

ON A NEW PATHOGNOMONIC SIGN OF MALARIA.

By Dr. Ciro L. Urriola, of Panama City, Panama.

I believe that the failure to find a new sign of malaria, during the absence of the parasite from the blood, is due chiefly to the fact that the investigations have not been directed toward the one characteristic that is never lacking, and which is found only in malaria, namely, the constant presence of blood-pigment in the plasma and in the urine. Although melanemia had long before been noted by distinguished observers, its true significance was only laid bare by Laveran in 1878, at Bône.

"The analysis of the anatomical lesions observed in victims of pernicious attacks, or of malaria cachexia," he says, "showed me that the characteristic lesion, the only constant one in malaria, consisted in the presence of pigmented elements in the blood. These pigmented elements were known to Frerichs, who described them very carefully; but their origin and nature were still very obscure. It was while studying the mode of formation of these pigmented elements that I was led to recognize their parasitic nature."

It was two years after this that Laveran first observed the malarial parasite; but the researches of this author relative to pigment consisted almost entirely of cadaveric examinations, except those that related to the presence of melaniferous leucocytes in the blood of malarial subjects; and he neither insisted on this sign as a method of clinical diagnosis, nor on the technique of seeking for the pigments in the plasma. Neither Laveran nor his successors in this field have demonstrated that the kidney is the principal emunctory of hematic pigment, and that it is in the urine that it is easiest to detect the presence of this pigment in the living subject.

At the beginning of my own investigations* I confined myself to finding in the blood-plasma granules or masses of free black pigment, by collecting from the ear a few drops of blood in a tube five centimetres long and eight millimetres in diameter, about one-third or one-half full of physiological salt-solution, or any other solution that preserves the corpuscles. This was centrifuged for five minutes, and a drop from the bottom was examined under the microscope; but, since September 18th, 1909, the day on which I first discovered that every malarial subject eliminates with his urine an enormous quantity of blood-pigment, my investigations have been directed almost exclusively to this excretion. The urine, gathered in a clean tube, is shaken and subjected to centrifugalization for five minutes; then a drop from the bottom of the tube is examined under a high power. The examination of the urine possesses many advantages over the examination of the blood: First, a large amount of liquid is handled and this can be obtained without any special technique; second, the pigment is more abundant in the urine than in the blood-plasma, and there it cannot be mistaken for any other substance.

*Vide **Urriola** (*Semaine Médicale*, January 4th, 1911).

The pigment appears in the urine and the blood-plasma under four forms: First, very fine granules almost always grouped in more or less considerable numbers; second, granules somewhat larger than the foregoing; third, large polymorphous masses, of varying size; fourth, granules enclosed in hyaline plaques or on leucocytes. Sometimes the fine granules and sometimes the coarser ones, associated with the large masses, predominate in the specimens examined.

Besides the granules of black pigment, occasionally we find, both in the plasma and the urine, grains of blue pigment, either enclosed in hyaline plaques or in epithelial cells from the bladder. These granules are very rare (from one to three in each preparation), but by persevering we can always find them. Finally, we sometimes find masses and grains of yellowish pigment (ochre-colored), which are already well known. The pigmentary formula of the urine of a malarial subject, no matter what form the disease may assume, may be expressed thus: Very abundant black blood-pigment; blue pigment, very constant but in small quantity; ochre pigment occasionally.

It is true that in many symptomatic fevers of different diseases, the microscopic field of the urine or plasma prevents more or less voluminous translucent masses of a yellowish color, dotted with granules or lumps of a black, red, or sepia color. Some of these granules or lumps break loose from the enclosing masses and float freely in the liquid of the preparation, where they might be mistaken for the pathognomonic blood-pigment of paludism, but they have not the charcoal or Chinese-ink-like tint,—an intense black which characterizes the veritable malarial pigment. Moreover, in changing the focus of the microscope slightly, a yellowish color appears around their borders which nearly always carry, besides, some fragments of the yellow transparent mass that have adhered to the granules. Finally, they are not as abundant as the true masses of blood-pigment.

HEAD-PAINS OF INTRANASAL ORIGIN.

By JOHN J. KYLE, M. D., of Indianapolis.

The various factors in the etiology of chronic head-pains are as numerous as the areas of the skull involved. The great majority of head-pains are anterior, while the minority are posterior, that is, about the occipital region. Those in the anterior or frontal region are more active in their intensity while those in the posterior portion are dull and not infrequently accompanied by nausea. In the absence of suppuration in the ear or brain lesions, pain in the back of the head, either acute or chronic in character, is usually due to some gastro-intestinal disorder, but may sometimes be associated with chronic nasopharyngitis, rheumatic in character. Some forms of ocular muscle insufficiency predispose to occipital pains. Pain in the anterior part of the skull, acute in character, is more often due to acute swelling in the attic of the nose, and, with the establishment of free ventilation by the administration of some drug and the restoration of normal equilibrium of the vasomotor system, it soon passes away if not associated with the onset of some febrile disease. From its location, pain in the anterior portion of the skull, chronic in character, may suggest certain factors, as follows:—

The points of irritation observed in head-pains are more often the

region of Meckel's ganglion, anterior prominence of the middle turbinate, lower turbinated body and the nasal process of the superior maxillary. This irritation may be due to hypertrophy alone, with or without contact, and pressure from deflected septum. Headache from intranasal pressure may come on at any time in life, but I think is more often observed in women than in men. The pain is usually unilateral. The amount of pressure or hypertrophy necessary to produce head-pains is, in many cases, very slight.

Frequently persistent unilateral headaches have responded to cauterization of the lower hypertrophied turbinate, in which no evidence of pressure could be detected. Pain of this character is probably due to increased blood-pressure or hypertrophy, and exceptionally to angioneurotic edema. It may also be due to local or general faulty metabolism, which may be chemical, bacterial or psychical, and directly influences the vasomotor system. Those pains, which may be due to syphilis or some general toxemia, frequently react to constitutional treatment alone, though pressure may be apparent upon ocular inspection. Pain in the frontotemporal and frontonasal regions and behind the eyes is more often due to intranasal pressure from deflected septum or hypertrophy of the turbinates than to sinus suppuration, but may sometimes be due to an error of refraction. Pain in the midorbital region is indicative of frontal sinus involvement or inflammation of the supraorbital nerve. Pain in the nasolabial region frequently occurs from irritation of the floor of the nares. Pain in the tonsil is often referred to the thyroid cartilage and middle ear. The pain of maxillary sinus disease is usually about the sinus.

Syphilis as a factor in causing swelling of the septum and region of the middle turbinate should not be overlooked. It is surprising how often swollen areas in the nose respond to antisyphilitic treatment, especially in those cases in which no history of the disease is given.

The medical treatment of head-pains from intranasal pressure depends upon the cause. Indefinite and ill-defined pains about the frontal and temporal regions, in the absence of acute sinus disease, are usually due to hypertrophic or hyperplastic changes in the middle turbinated body, and demand surgical interference. Vasomotor disturbances, localized in the nose from toxemias, not infrequently respond to spraying the nasal cavity with a mild alkaline solution, to which has been added a small amount of cocaine, and calomel as a purgative. For the control of pain, the following prescription is most efficacious:—

℞ Acetanilid. . . . . grs. 1
   Codeine sulphate. . . . . grs. 1/16
   Ext. cannabis ind. . . . . grs. ⅛
   Aspirin. . . . . grs. 2½
   Caffeine. . . . . grs. 1/16

———

## A POINT IN USING STAINS.

By S. STROUSE, M. D., of Chicago.

In using many stains, notably the Wright blood-stain or carbol-fuchsin, there is considerable danger of a precipitate forming and ruining the slide. This can almost invariably be averted by adding distilled water to the preparation *before* pouring the stain off, and then continuing washing, instead of washing after the stain has been poured off, as is usually done.

A HINT TO THE ANESTHETIST.

By Francis Reder, M. D., of St. Louis.

In all instances where a general anesthesia is desired, ether given by the drop method is the anesthetic of choice. It is the aim of the anesthetist to establish a drop method that will prove satisfactory.
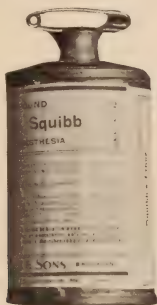
A simple and practical way, entailing the least amount of time, can be attained by taking an ordinary safety pin and introducing it through the soft solder of the can containing the ether, as is shown in the illustration.

It is gratifying to note the satisfactory manner in which the administration can be conducted by this simple procedure.

THE PESSARY IN UTERINE RETRO-DISPLACEMENTS.

By Hugo Ehrenfest, M. D., of St. Louis.

The use of the pessary as a support for a retro-deviated uterus is based on definite mechanical principles. Good, and even excellent, immediate results, and in some instances also satisfactory, permanent results are dependent upon a thorough familiarity with the mechanism of the pessary. The length and width of the vagina, the size of the posterior fornix, the condition of the perineum and the position of the uterus in the individual case, call for a definite shape of pessary. Therefore, this instrument should be employed only by the physicians who are able to bend a hard rubber ring of suitable size into a pessary that will fit the individual patient. No dentist would think of buying a ready-made set of teeth and expect his patient to feel comfortable while wearing it.

CORRESPONDENCE

PARIS LETTER.

THE THERAPEUTIC RÔLE OF ARSENOBENZOL IN OTHER DISEASES BESIDES SYPHILIS.

By Auguste A. Housquains, M. D.

The numerous articles and brochures, which have been published on the therapeutic value of dioxydiamidoarsenobenzol in the treatment of syphilis, would lead one to suppose that this preparation is effective only in this disease. According to the opinion of many physicians, arseno-benzol is the specific remedy for an affection whose signs and symptoms are of a determinative nature. But, although arsenobenzol has been used especially to combat syphilis, it would be an error on the part of any physician to overlook the fact that this preparation can render signal services in a certain number of non-syphilitic affections; and it would be a mistake not to have recourse to it every time that it can be employed to good use. In this connection, its arsenic-content, which is large, and its relative innocuity which permits it to be introduced into the organism in large quantities, without deleterious results, should be remembered. Hence, its use has been indicated in all diseases which are habitually relieved by an arsenic therapy.

Numerous attempts have been made to substitute arsenobenzol for other preparations of arsenic. For example, tumors, and especially sarcomas, have been tentatively treated in this way, and the result has been that the tumors have grown smaller, and the symptoms in some incontestable cases have been ameliorated. But it is of importance to record that the improvement thus obtained was not lasting; at least, in those special conditions to which the treatment was applied. Further study will be necessary in order to determine to what degree arsenobenzol may be considered an efficacious treatment in cancerous affections.

Similar favorable results have been observed in the treatment of psoriasis and in lichen ruber planus. As to the treatment of pernicious anemia by arsenobenzol, the results until now cannot be considered encouraging.

Finally, there is an affection for which arsenic medication is of classical value,—namely, chorea. The published facts are not very numerous, but it appears that arsenobenzol can be successfully used where arsenic itself has yielded no results.

Besides those affections for which we are in the habit of prescribing arsenic, arsenobenzol has been given tentatively in microbian diseases. These trials have not been very numerous, and the results obtained, at the present writing, have not been very satisfactory. Its administration

has been tried in cases of variola, exanthematous typhus, streptococcemia, staphylococcemia and leprosy; but none of these essays has given results which would permit us to express a definite idea as to the therapeutic value of arsenobenzol in these affections.

Of more interest is the question of treatment by this therapeutic agent in diseases not due to spirilla. In a study, recently published by MM. Castaigne and Gouraud, the matter of the efficacy of arsenobenzol in these diseases is thoroughly discussed. It should not be forgotten that in the beginning arsenobenzol was regarded as the remedy *par excellence* in spirilloses, and that, upon further study, it was applied to the treatment of trypanosomiases and divers other exotic diseases due to protozoa, notably to malaria. Ehrlich himself first employed it in the treatment of recurrent fever, and it was on account of the analogy which exists between this disease and syphilis that he advocated its use.

Having reviewed, in a brief manner, the various diseases not due to spirilla in which arsenobenzol has been administered, I shall now show, according to the observations of a number of authors, what the results obtained have been.

In syphilis the recurrent fever constitutes the real entity of spirilloses. It would be well to remark at once that the results of the experiments undertaken by Hata, at Ehrlich's suggestion, were, from the beginning, satisfactory, in spite of the extreme difficulty that obtained during the investigations on account of the intensity of the disease and its resistance to arsenobenzol, the dose of which varied according to the quantity of spirilla injected. The experiments were made with mice and rats; these animals were injected with spirilla from two different sources: one from cultures of European origin, the other being of African source. Without entering here into the technique of the doses employed, it would be well to state at once that of the twenty-four mice injected there was only one death following the first injection and three deaths from unknown causes. As to the five animals injected, but not treated, and which were kept under observation so as to study the results of the injections, all died. In none of the cases did Hata observe trembling, convulsions, or loss of vision. He was thus led to conclude that the action of arsenobenzol, as regards experimental recurrent fever, was superior to that of all the other therapeutic agents which had been employed up to that time.

In man, the limited number of experiments which were made gave positive results. When arsenobenzol was used, the recurrences were less frequent than when other preparations were prescribed, doses of 30 cgrm. injected intravenously proving efficacious. In almost all the cases the temperature, which before the injection was from 39 to 40° C., showed a slight elevation followed by a decided chill of short duration, and then a quick descent to 36° C. or even to 35° C. Perspiration was abundant, but was not attended by collapse. After some time all the cerebral symptoms and the pain disappeared. The spirochætæ, which had been regularly observed in the blood, disappeared after from seven to ten hours.

To sum up, it can be stated that arsenobenzol has a uniform specific toxicity for the spirillum of Obermeyer and for that of Schaudinn. Without doubt it constitutes the heroic treatment in recurrent fever. But though this be so, the treatment by arsenobenzol is the only rational treatment that should be used at present in recurrent fever, since the use of all other arsenical preparations hitherto employed was not based on the true pathogeny of the disease.

As regards the special toxic action of arsenobenzol on spirilla, there can be no further question; hence, every time spirilla are active in the pathogeny of an affection, this should be considered as an indication for its administration. We know, for example, that Vincent's angina is due to a spirillic symbiosis. Achard and Flandin, for instance, treated successfully, with arsenobenzol, a woman who had considerable edema and also ulceration of the soft palate with complete destruction of the uvula. Hydrogen peroxide and methylene-blue yielded no results; but, from the time arsenobenzol was employed, the temperature fell rapidly, the exudates quickly disintegrated, and cicatrization followed without delay.

Ehrlich, Rumpel, and Gerber have observed analogous cases and have obtained good results with arsenobenzol. But it is necessary to remember that the cases of Vincent's angina, up to date, are few in number; hence, we should be positive that the disease is Vincent's angina before employing a preparation, such as arsenobenzol, which always carries with it some risk to the patient. Since it has been proved that the injection of this preparation always produces a decided reaction in the patient, caution should be exercised to limit its applicability only to those cases in which the complications are sufficiently grave to justify so heroic a therapy. It is beyond a doubt that a number of cases of Vincent's angina can be cured easily in the usual way,—that is to say, by hydrogen peroxide and methylene-blue.

Another affection which resembles spirilloses, but is really due to protozoa, should now engage our attention—namely, sleeping sickness. Until the discovery of arsenobenzol, the therapy of this disease was exclusively limited to the use of organic arsenic; hence, it was natural that the newer preparation was employed for further experiments. Injections into rats were quickly followed by the disappearance of the trypanosome. As regards the human being, the question of the efficacy of arsenobenzol in sleeping sickness has not as yet been satisfactorily answered, for the reason that experiments have been made only in a few cases; and though the results have not been unsatisfactory, it would be wrong to draw definite conclusions before a larger number have been treated.

On the hematozoa of malaria, arsenobenzol has a decided effect, but this effect varies according to the case or rather according to the type of fever. In tertian cases a dose of 60 cgrm. is indicated. In the quartan type, this preparation is without effect. Hence, it can be said that in those cases in which quinine is without value or is badly tolerated, arsenobenzol should be used; particularly in the tertian type of fever. But since it is necessary to inject doses which are very large, one can readily see that the use of this preparation is not without danger.

Two cases of filariasis treated by arsenobenzol have been published. The results were positive; therefore, we may be hopeful as to the employment of this therapy in this disease. Bouton d'Alep (Oriental sore) has also been benefited by doses of 60 cgrm. As to the experiments which have been made with arsenobenzol in kala-azar, the results at the present writing have been gratifying enough to encourage the use of this preparation.

In conclusion, it would be well to recall the words of MM. Castaigne and Gouraud as to the great difference in the results obtained in the treatment, by arsenobenzol, of the three groups of diseases which we have mentioned. In the first place, in those diseases which were hitherto

treated altogether by means of an arsenical therapy, arsenobenzol, on account of its inherent strength, is a better preparation than any other arsenical compound, and has been the means of increasing, very materially, the percentage of good results; secondly, in infectious diseases, arsenobenzol seems to be not only inefficacious, but harmful, if not dangerous; and, thirdly, in diseases due to protozoa the value of this therapeutic agent is incontestable.

To repeat what we said at the beginning of this letter, if arsenobenzol has caused a veritable revolution in the therapy of syphilis, it nevertheless devolves upon us not to neglect its rôle in the treatment of certain affections which are non-syphilitic, since the results obtained up to the present in recurring fever, in Vincent's angina, in sleeping sickness and in certain forms of malaria, are gratifying enough to found thereon our greatest hopes.

December 10th.

THE HARPOONING PROCESS IN SPORADIC TRICHINOSIS.

To the Editor of the Interstate Medical Journal.

Sir,—In reading the editorial "Sporadic Trichinosis," in the December (1911) issue, I noticed an allusion to the "harpooning process." I have found the harpooning of muscle-tissue an entirely inadequate proceeding, as sufficient muscle-tissue cannot be obtained by such means as either to assure or negative a diagnosis of trichinosis. An incision should be made over the muscle suspected of being the host of the trichinella, and a small strip of muscle, some half inch long, should be excised. I feel sure that, because of the faulty technique in using the harpoon, many cases of trichinosis have not been recognized.

After the recognition of the trichinella in one of a group of suspected cases, it is fair to assume the diagnosis in the others without microscopic confirmation, provided they show the clear clinical picture.

I write not at all in the spirit of criticism or controversy, but merely because I am convinced that the harpoon is a weapon that should be discarded in this connection.—I am, etc.,

J. NORMAN HENRY.

Philadelphia, December 11th.

DIAGNOSTIC AND THERAPEUTIC NOTES.

PROGRESS IN THE TREATMENT OF DIPHTHERIA.—Meyer (*Berl. klin. Wochenschr.*, 1911, No. 45). Recent advances in the treatment of diphtheria consist, first, in the increasing use of intravenous and intramuscular injections (the absorption of serum administered hypodermically being slow) and, secondly, in the use of larger doses (15,000 to 30,000 units in severe cases). He advises the use of still greater doses, in cases of post-diphtheritic paralysis. As regards non-specific treatment, the attempt to dissolve the false membrane by means of pyocyanase is advisable.

THE ADMINISTRATION OF GLUCOSE IN SEVERE DIABETES.—Klemperer (*Therapie der Gegenwart*, 1911, No. 10). In order to determine whether v. Noorden's oatmeal diet was dependent for its success upon some quality inherent in oats, the writer administered to a series of severe diabetics, pure grape sugar. Cases were selected, in which the urine contained much sugar, and in which a starch-free diet did not lead to a disappearance of the glycosuria. The same rules were followed as in the oatmeal diet. After a period during which the patients received no meat, 100 to 150 gr. of grape sugar were given, the diet still remaining free from meat. The results were quite as good as with the oatmeal diet. Klemperer concludes that the latter may be replaced by any starch-food (bread, rice, potato and the like) provided that the regimen be preceded by a meat-free period and that, during its administration, the amount of proteid eaten be maintained as low as possible.

A SIMPLE METHOD OF PURIFYING ALMOST ANY INFECTED WATER FOR DRINKING PURPOSES.—Nasmith and Graham (*Journ. Royal Army Med. Corps*, July, 1911. Abstr. *United States Naval Med. Bulletin*, October, 1911). From bacterial counts of raw, artificially infected (B. typhosus and B. coli), and chlorinated waters from the Province and Lake Ontario the authors offer the following certain method for rendering polluted water safe:—

(1) Take a teaspoonful of chloride of lime, containing about one-third available chlorine, and remove the excess of powder by rolling a pencil or other round object along the top of the spoon, or by flattening it with a penknife-blade, so that the excess will be squeezed off.

(2) Dissolve the teaspoonful of chloride of lime in a cupful of water, making sure that all lumps are broken up, and to it, in any convenient receptacle, add three more cupfuls of water.

(3) Stir up the mixture, allow to stand for a few seconds in order to

let any particles settle (this stock solution if kept in a tightly stoppered bottle may be used for four or five days), and add one teaspoonful of the milky stock solution to two gallons of the water to be purified in a pail or other receptacle. Stir thoroughly in order that the weak chlorine solution will come in contact with all the bacteria, and allow to stand for ten minutes. This will give approximately one-half part of free chlorine to a million parts of water, and will effectually destroy all typhoid and colon bacilli, or other dysentery-producing bacilli in the water. The water will be without taste or odor, and the trace of free chlorine added rapidly disappears.

Freshly manufactured chloride of lime should contain about one-third available chlorine, but it rapidly deteriorates if exposed to air or if kept in cardboard containers instead of glass or zinc. In case the lime is believed to have deteriorated, 50 per cent. more of the stock solution should be used. Thorough mixing is essential, as is also freedom from lumps of organic matter, mud, or salt. The presence of hydrogen sulphide requires larger quantities of chlorine solution. While 0.3 parts of chlorine per million is sufficient for purification, the 0.5 parts obtained in the above procedure give a certain margin of safety, and neither taste nor odor can be detected.

An Improved Form of Heller's Ring.—Michel (*Chemische Zeitschr.,* Vol. 35, p. 183). In carrying out Heller's technique in the usual way, much care has to be taken that the concentrated nitric acid and the urine to be added do not mix, as otherwise the acid tends to dissolve the albumin and a turbid zone between the liquids is not obtained. The author, in order to prevent the liability of this mixing, increases the specific gravity of the nitric acid by saturation with ammonium-nitrate. About two cubic centimetres of the reagent thus prepared are placed in a test tube and one cubic centimetre of the urine under examination added drop by drop from a pipette. If a large amount of albumin is present, a sharply defined ring is produced at once; with traces it appears in a short time. If the test-tube is shaken greatly, the whole of the urine layer becomes turbid, whereas if ordinary concentrated nitric acid is employed the turbidity dissolves at once. On heating the turbid fluid with continual shaking it becomes clear, but when cooled again the albumin once more separates as a more or less pronounced turbidity. In the test with ordinary nitric acid the albumin is immediately decomposed in the cold and the solution cannot again be made turbid.

The Influence of Passive Congestion of the Extremities Upon Bleeding During Operations.—Zoeppritz (*Mittheil. a. d. Grenzg.,* 1911, No. 3). The procedure, first described by Dawbarn, has been carefully tested by the writer. A rubber bandage is applied, as near as possible to the root of one extremity, tightly enough to obstruct the outflow of blood through the veins, but not so tightly as to obliterate the arteries. The extremity becomes cyanotic and edematous, but this is not at all harmful. It is well to wrap the extremity in cotton to avoid undue cooling. The resulting diminution of the hemorrhage was very marked and was found most useful in operations involving the skull, the liver and the

back. When the skull is opened, the brain is found collapsed, which greatly facilitates the search for the lesion. Its effect upon narcosis also was favorable. In none of the 112 operations, in which the writer used this procedure, was there any ill effects, in particular, there was no post-operative hemorrhage. There are, however, certain absolute contra-indications. These are hypertension, arteriosclerosis, anemia, chlorosis, sepsis, leucemia and other blood diseases that are accompanied by a tendency to thrombosis.

———

PULMONARY TUBERCULOSIS.—-Aufrecht (*Berl. klin. Wochenschr.*, 1911, No. 30). In a paper that is well worth reading, Aufrecht discusses some neglected aspects of pulmonary tuberculosis. Cough, he points out, is not an early symptom in pulmonary tuberculosis; it is a complication rather than a symptom and may be absent when the tuberculous process is comparatively far advanced. It is merely the result of a laryngeal catarrh, that may or may not complicate the tuberculous process. Pus and mucus may remain for hours in the bronchi without causing cough. The cough itself produces a condition of strain in the tissues surrounding the tuberculous focus, leading to exudation into the alveoli, a condition conducive to a spread of the infection. Hence the treatment of the cough is an indispensable element in our care of the patient. Even when the sputum is plentiful, we need not hesitate in our endeavors to diminish the cough, since the ciliated epithelium of the air-passages is quite able to transport this secretion into the pharynx, whence it may readily be removed by hawking.

The pleurisy, that so often complicates early pulmonary tuberculosis, is due to an embolic process, leading to an infarct of the lung tissue that extends to the surface of the lung, thereby involving the pleura and leading to an effusion. The origin of the embolus is usually to be sought in the vein leading from an infected mediastinal gland.

BOOK REVIEWS.

MENTAL MECHANISMS. By William A. White, M. D., Author of "Outlines of Psychiatry"; Superintendent Government Hospital for the Insane, Washington, D. C.; Professor of Nervous and Mental Diseases, Georgetown University, Washington, D. C., etc. New York: The Journal of Nervous and Mental Disease Publishing Co. 1911.

This is No. 8 of the "Nervous and Mental Disease Monograph Series." The title "Mental Mechanisms" necessarily leads one to expect that White will deal with mental activities from a purely mechanistic point of view. This is not adhered to, however. White says in his preface that the teacher becomes naturally a writer of books. He is sure, sooner or later, he says, to feel the need of a book as a medium of his own individual manner of expression. If this is true, it would be a great misfortune, for every teacher would have the same right to put his notions in print as the author of this monograph, and our already overgrown neurological literature would attain such vast proportions that no one could possibly keep up with it.

"Mental Mechanisms" is not a continuous performance; the various chapters deal with essentially different subjects, so that the reader is hurried from one to another and wonders just why they are placed next to each other. The constitution of consciousness is followed by a chapter on types of reaction; this, again, by the content of consciousness, which takes up such subjects as dreams, symbolism, psychoses and folk-lore; this, again, is followed by a chapter on the complex, which is again succeeded by a chapter on current conceptions of hysteria. The last chapter is devoted to preventive principles in mental medicine. Therefore, we have here a number of attempts, serious in their nature, it is true, aiming to elucidate some of the prevailing problems in psychology. If read together, as was stated before, they present no connected treatise, or if read separately, each one is not sufficiently elaborate to give more than a glimpse of the territory that is being covered. Certainly, for the student, such a book is of small value. It would lead him into endless confusion, and in reality distract his interest from more vital questions. As the purpose of the book is admittedly for the student, it must be said that in so far it fails distinctly of its purpose. For the neurologist, at all well informed on the recent trend of psychological thinking, such a book would be of only limited value. As neurologists, we are much less concerned with White's individual views and his individual reactions to the problems he is writing about than we are with some aspect, even though that be little, of the total truth which is connoted under the expression of mental activities. We might expect to find some intelligent discussion of the Freudian psychology, particularly the dream theory, and the place that symbolism plays in dream interpretation. It must be said that White's explanation of the Freudian psychology is distinctly disappointing. It does not begin to compare with many translations which are now available and with many original contributions, which have appeared from the hands of English and American authors. The examples given by White of dreams and their interpretation would, from the standpoint of a Freudian disciple, appear rather ridiculous. The style of "Mental Mechanisms" is discursive and gives the impression that White is not entirely sure of his meaning. There is a certain looseness of expression, which leads the reader to believe that the author is as much puzzled with his own explanation of mental phenomena as the reader is puzzled in understanding them. It is borne upon the reviewer of this book, as he is compelled to read the attempts of physicians to write upon psychological things, that it is only a rare and unusual medical intelligence that is gifted with the insight and ability to express his thoughts with clearness and intelligence on mental phenomena.

In conclusion, it might be said that "Mental Mechanisms" fails because, from the very inception of the purpose expressed in the opening chapter, it is doomed to failure. Psychological problems that are at present only half understood cannot be written about as though the explanation were ready at hand. Things

of this kind are not made easy by insisting that they are so, nor is the cloud of ignorance which surrounds mental activities to be brushed aside by insisting that all is as clear as day. As a book of some interest, "Mental Mechanisms" can be read with some pleasure. Beyond this, the reviewer finds in it no particular usefulness.

THE WASSERMANN SERO-DIAGNOSIS OF SYPHILIS IN ITS APPLICATION TO PSYCHIATRY. By Dr. Felix Plaut, Scientific Assistant in the Psychiatric Clinic of the University of Munich. Authorized translation by Smith Ely Jeliffe, M. D., Ph. D., and Louis Casamajor, A. M., M. D. New York: The Journal of Nervous and Mental Disease Publishing Co. 1911.

This is No. 5 of the "Nervous and Mental Disease Monographs," and is a very distinct and valuable contribution to the subject. There is, perhaps, no one better able than Plaut to write with authority upon the subject of the Wassermann reaction in its application to psychiatry. Of great importance is the first chapter on the development and nature of the sero-diagnosis of syphilis. Here we can find, clearly stated, the genesis of the Wassermann reaction, and can place clearly the successive stages by which and the work of the men through which the Wassermann reaction has reached its present form.

Chapter II is devoted to a discussion of the practical utility of the different methods, and here again we meet the same clearness and definitiveness of expression that characterizes the early chapter.

This is followed by the results of the Wassermann reaction in various types of diseases, such as cerebral syphilis, dementia, paresis, etc.

There are included in this book, in addition, a great many clinical histories, which, though brief, are amply sufficient to cover the clinical side of the cases.

A chapter devoted to comparative serological and cytological investigations concludes the book, and appended is a splendid bibliography, which, unfortunately, goes no further than the year 1908.

This book can be unhesitatingly recommended as the one authoritive publication up to the year of its publication, which treats of the relation of the Wassermann reaction to the problems presented by neurological and psychiacal material. The *Journal of Nervous and Mental Diseases* is to be congratulated for giving to the neurologist, who has not the ability to read the foreign literature, or who cannot make use of it, so valuable a monograph.

SCIENCE IN THE KITCHEN. By Ella Eaton Kellogg. A Scientific Treatise on Food Substances and Their Dietetic Properties Together with a Practical Explanation of the Principles of Healthful Cookery. A Thousand Choice, Palatable, and Wholesome Recipes. Revised and Enlarged Edition. Battle Creek, Mich.: Good Health Publishing Co. 1910. Price, $3.00.

Mrs. Kellogg's cookery book has many good qualities as a guide in the kitchen and, moreover, is written in such a way that what she says carries a degree of conviction that is not often found in books of this nature. Instead of merely mentioning recipes, the authoress really tells a story of the culinary art that is well worth reading on account of her clever observations on fruits, breadstuffs and bread-making, and other kindred subjects. And again, she does not limit herself to her own preferences in the matter of the preparation of food, but takes so large a survey of the subject that nationalism—that bane of most cookery books—is a negligible quantity.

CESARE LOMBROSO. A Modern Man of Science. By Hans Kurella, M. D., Author of "Natural History of the Criminal," etc. Translated from the German by M. Eden Paul, M. D. New York: Rebman Company. Price, $1.50.

In a small book of 200 pages Hans Kurella has managed to condense the chief aspects of the life and work of Cesare Lombroso. The modern Italian School of Criminology, chiefly represented by Lombroso and his students, has been poorly appreciated and understood by English readers, mainly owing to the fact that Lombroso has been labeled by what was considered his chief contribution to the science. It has been very difficult up to the appearance of this little book for English writers to determine just exactly what Lombroso stood for personally, and with just what phase of criminology his work has been chiefly associated. Kurella aims to put down very briefly and clearly, without confusing the reader, wherein Lombroso's work is of inestimable value. He emphasizes particularly that Lombroso arrived at his conclusions only by an immense amount of very careful and accurate work. It was after this mass

of data was gathered that Lombroso was enabled to formulate his conclusions. As Kurella has pointed out, whether the conclusions of Lombroso should prove to be true or not, the documentary evidences containing the result of Lombroso's study on criminals will always remain a treasure-house for future students. The term, School of Positive Criminology, with which Lombroso's name has become associated, therefore, has a new meaning, and to those interested in the subject this little book of Kurella's will prove a valuable introduction.

A word must be said in appreciation of the translation by Eden Paul. The reviewer knows of no little work on this subject which is as interesting and fascinating as Kurella's book. It certainly does succeed in giving the reader a glimpse into the life and activity of one of the most remarkable of the Italian investigators on the subject of criminology. That is saying a great deal.

This book is unhesitatingly recommended to neurologists to whom contact with the criminal is a part of their activity.

COMPENDIUM OF REGIONAL DIAGNOSIS IN AFFECTIONS OF THE BRAIN AND SPINAL CORD. A Concise Introduction to the Principles of Clinical Localization in Diseases and Injuries of the Central Nervous System. By Robert Bing, Privat-Docent for Neurology in the University of Basle. Translated by F. S. Arnold, B. A., M. B., B. Ch. (Oxon.). Revised by David I. Wolfstein. With seventy illustrations. New York: Rebman Company. Price, $2.50.

When Bing's book appeared in German, it met so well a need, that its translation into English seemed to be only a matter of time and opportunity. The English translation leaves us with a short treatise of about 200 pages, in which all the chief features of neurological diagnosis are carefully considered. The diagrams and illustrations are very well made and carefully selected, particularly the former which are designed solely to make clear the points at issue. While this book was written primarily for physicians in general practice and surgeons who wished to acquaint themselves at first hand with the data of neurological diagnosis, specialists, nevertheless, will find it very useful; and it will, no doubt, be in their hands far more than in the hands of those for whom it was designed. Too much praise really cannot be given this little book; its utility seems to increase with its use. A word must be said of the excellent translation. The reviewer has not come across a translation from the German into English which seems better to fill the ideal standard; that is, clearness in its expression, accuracy and the proper selection of words.

This book can be earnestly recommended to internists and surgeons to whom the problems of neurological diagnosis have been up to this time too difficult and puzzling to acquire for themselves, and to neurologists who wish to have ready at hand a clear statement of the data necessary for accurate neurological diagnosis and localization.

THE PARASITIC AMOEBAE OF MAN. By Charles F. Craig, M. D., Captain, Medical Corps, United States Army. From the Bacteriological Laboratory of the Army Medical School, Washington, D. C., and the Rockefeller Institute for Medical Research New York City. Published with the Authority of the Surgeon General of the United States Army. Philadelphia and London: J. B. Lippincott Company. 1911. Price, $2.50.

Before the appearance of Schaudinn's work in 1903, no clear distinction has been made between the various species of amœbæ infecting man. He was able to differentiate two species, one causing a form of dysentery, to which he gave the name, entamœba histolytica; and another, a harmless commensal of man, which he named entamœba coli. Captain Craig published his first report confirming Schaudinn's observations, in 1905, and has continued his studies of these protozoa ever since, both in this country and in the Philippines.

In this volume he describes in detail all the various species of amœbæ which have been described as parasitic in man, many of them hardly known by name to any but specialists in tropical medicine. Among these are the entamœba tropicalis, studied by Lesage in 1908; entamœba minuta, described by Elmassian in 1909; and entamœba nipponica, described by Koidzumi in the same year. In addition to these, there are a few so-called species which possess little interest or scientific value by reason of imperfect observation. All are illustrated and described with great care. The average reader will, however, be most interested in the introductory chapters, which contain an account of the general morphology and biology of amœba, a field in which recent discoveries have fairly revolutionized our conceptions of these tiny animals, formerly thought to be so simply organized.

A Textbook of Pathology. With a Final Section on Post-Mortem Examinations and the Methods of Preserving and Examining Diseased Tissues. By Francis Delafield, M. D., LL. D., Emeritus Professor of the Practice of Medicine, College of Physicians and Surgeons, Columbia University, New York, and T. Mitchell Prudden, M. D., LL. D., Emeritus Professor of Pathology, College of Physicians and Surgeons, Columbia University, New York. Ninth Edition. With Thirteen Full-Page Plates and Six Hundred and Eighty-Seven Illustrations in the Text, in black and colors. New York: William Wood & Co. 1911. Price, $5.50.

Any book which has stood the test of time long enough to warrant nine editions offers an easy task to the reviewer. The present edition, revised without the co-operation of the senior author, attempts to bring the subject well up to date, and on the whole has been successful. The ever-spreading grasp of pathology and its drafts upon chemistry and other allied biological sciences are recognized, and discussions of pathological physiology are brought into the text when warranted. We think a wise step was made in excluding clinical pathology and bacteriology from the book,—each subject is big enough as an entity to require more individual treatment than a general textbook on pathology can give. The book might be criticised for errors of omission; for instance, the discussion of "leucocyte extract" is entirely too limited. If the subject is to be mentioned at all it seems hardly justifiable to omit the work of Petterson and others which preceded the very interesting studies of Stiss and Zinsser. Likewise the newer studies on the hypophysis are not brought up to date. The book, however, still maintains its high standard of general excellence of text, of well-chosen, beautifully executed illustrations, and of choice of references for students' use.

Principles of Anatomy. The Abdomen Proper, described and illustrated by Text and Plates. By Wm. Cuthbert Morton, M. A., M. D. Edin. New York: Rebman Company. 1911. Price, $12.00.

The novel and interesting feature of this book is the plates that accompany it. They are almost of folio size and are printed in colors on translucent paper. Each sheet is devoted to some one set of tissues, the anterior aspect of which is printed on one side of the sheet, the posterior on the other. If one then holds such a sheet up to the light, both anterior and posterior aspects are visible, and the whole appears as the tissue would if it were semitransparent. Thus the first sheet contains, on one side, the muscles and fascia of the anterior abdominal wall with their blood-supply, lymphatics and nerves as seen from in front; on the other side, the same is seen from behind. The fourteenth sheet presents the back wall of the abdomen in similar fashion. If these two sheets are placed back to back and held up to the light, the picture is that of the abdomen emptied of its contents and rendered translucent. Again, the plates picturing the various organs may be placed between these sheets and their relations to the abdominal walls clearly made out; or the pictures of various organs may be combined and their relations made evident by transmitted light. The entire series is most interesting.

The text is of less immediate service to the practitioner, but is clear and concise. The presentation is novel in many respects and should be especially useful as a guide in dissection.

Lehrbuch der Allgemeinen Pathologie und der Pathologischen Anatomie. Von Prof. Dr. Hugo Ribbert, Ordentlichem Professor der Allgemeinen Pathologie und der Pathologischen Anatomie und Direktor des Pathologischen Institutes der Universitaet Bonn. Mit 848 figuren. Vierte Auflage. Leipzig: Verlag von F. C. W. Vogel. 1911. Price, paper 16 m., cloth 18 m.

Ribbert's Textbook of General Pathology is so well known that it seems to be futile to attempt to write a criticism. The mere fact that this textbook has appeared in its fourth edition within a comparatively short space of time is ample proof of its high appreciation by the medical fraternity. The pathological institute of Bonn, under the able directorship of Ribbert, has become world famous, and the book furnishes a clear, concise portrayal of the work of this famous teacher and investigator. On glancing through the work, one is forcefully impressed with the accuracy, care and honesty with which the statements are brought forward. These factors are the strong characteristics of the book. All subjects are treated exhaustively, and yet the discussions are not drawn out unnecessarily so as to become tiresome to the reader. For instance, the

ever interesting subject of inflammation is interpreted in so simple and yet so masterful a manner that it reads more like a narrative than a technical explanation. The book possesses so many commendable features which make it equally interesting to the student as well as to the practitioner, that it is impossible to single out a special subject; it has to be read and studied to be appreciated. The illustrations of the book are splendid; they are clear, accurate and helpful to the student, and they possess the additional advantage of being original and true reproductions of actual conditions. The mechanical make-up of the book is excellent.

INTERNATIONAL CLINICS. A Quarterly of Illustrated Clinical Lectures and Especially Prepared Original Articles on Treatment, Medicine, Surgery, Neurology, Paediatrics, Obstetrics, Gynaecology, Orthopaedics, Pathology, Dermatology, Ophthalmology, Otology, Rhinology, Laryngology, Hygiene, and Other Topics of Interest to Students and Practitioners. By Leading Members of the Medical Profession Throughout the World. Edited by Henry W. Cattell, A. M., M. D., Philadelphia, U. S. A., with the collaboration of Wm. Osler, M. D., Oxford; John H. Musser, M. D., Philadelphia; A. McPhearan, M. D., Toronto; Frank Billings, M. D., Chicago; Chas. H. Mayo, M. D., Rochester; Thos. H. Rotch, M. D., Boston; John G. Clark, M. D., Philadelphia; James J. Walsh, M. D., New York; J. W. Ballantyne, M. D., Edinburgh; John Harold, M. D., London; Richard Kretz, M. D., Vienna; with regular correspondents in Montreal, London, Paris, Berlin, Vienna, Leipsic, Brussels, and Carlsbad. Volume III. Twenty-first Series, 1911. Philadelphia and London: J. B. Lippincott Company. 1911. Price, $2.00.

In every series such as this there must be a certain degree of inequality, and one is not surprised to find some issues good and others poor. This volume distinctly belongs to the latter class. In each new volume of "International Clinics" one has learned to expect a series of articles representing the best that is done and thought in medicine. Such articles are woefully lacking here. The good things, such as Christen's dynamic pulse measurements, have appeared in full elsewhere and should be familiar to most readers of this book.

ORTHOPEDIC SURGERY. By Edward H. Bradford, M. D., Surgeon to the Boston Children's Hospital; Consulting Surgeon to the Boston City Hospital; Professor of Orthopedic Surgery, Harvard Medical School, and Robert W. Lovett, M. D., Associate Surgeon to the Boston Children's Hospital; Surgeon to the Infants' Hospital, the Peabody Home for Crippled Children and the Massachusetts Hospital School for Cripples; Assistant Professor of Orthopedic Surgery, Harvard Medical School. New York: William Wood and Co: 1911. Price, $3.50.

This textbook on Orthopedic Surgery is so well known and its value is so well appreciated that it needs but mention as a new edition to attract the attention of anyone interested in the subject of orthopedic surgery. Former editions of this work were of a more extensive character than the present one; that is to say, in them an endeavor was made to cover the whole subject in a complete manner. This present edition is a condensed handbook, based upon its predecessors. For the sake of brevity, the authors have omitted the presentation and critical discussion of different views. It is intended in this compact, brief outline of orthopedic surgery to give a statement of accepted opinions and to outline well-established treatment for the conditions which are commonly grouped under the term of orthopedic surgery.

The book has the same illustrations and is as well printed as the former editions.

CYSTOSCOPY AS ADJUVANT IN SURGERY WITH AN ATLAS OF CYSTOSCOPIC VIEWS AND CONCOMITANT TEXT FOR PHYSICIANS AND STUDENTS. By Staff-Surgeon Dr. O. Rumpelm, Lecturer in Surgery at the University of Berlin. Only authorized English translation by P. W. Shedd, M. D., New York. With 85 illustrations in color on 36 plates and 22 textual figures. New York: Rebman Company. Price, half leather, $8.50.

This manual, containing 85 illustrations which are beautifully got up, is a great help to the cystoscopist. The pictures are very pretty and some are quite unusual. The first part of the book is devoted to discussion of the lesions encountered in the bladder, kidneys, and ureter, which require cystoscopic examination. Among the chapters are Congenital Anomalies, Cystitis, Prostatic

Hypertrophy, Concretions and Foreign Bodies, and a chapter devoted to the tests for renal function. The book is very satisfactory in that most of the cases are worked up clinically, surgically, and pathologically. It is a very desirable book for the cystoscopist.

MANUAL OF CYSTOSCOPY. By J. Bentley Squier, M. D., Professor of Genito-Urinary Surgery, New York Post-Graduate Medical School and Hospital, and Henry G. Bugbee, M. D., Instructor in Genito-Urinary Surgery. New York Post-Graduate Medical School and Hospital. New York: Paul B. Hoeber. 1911. Price, $3.00.

Squier and Bugbee have presented a very attractive little manual consisting of 117 pages, containing 26 plates. The first chapter takes up the history of cystoscopy. The next chapter is devoted to the technique of cystoscopy, such as preparation of the cystoscope and the patient. They also give a very excellent description of the pictures seen in the normal and pathological bladder, respectively, and present plates indicative of the various lesions. The other chapters are devoted to ureter catheterization, cystoscopy in the female, operative cystoscopes, photographic cystoscopes and observations upon cystoscopic diagnosis. Their descriptions are concise and clear and presented in a manner to be easily grasped.

THE TREATMENT OF FRACTURES. With Notes upon a Few Common Dislocations. By Chas. Locke Scudder, M. D., Surgeon to the Massachusetts General Hospital; Lecturer on Surgery in the Harvard Medical School; etc. Seventh Edition, thoroughly Revised and Enlarged. With 990 illustrations. Philadelphia and London: W. B. Saunders Company. 1911. Price, polished buckram, $6.00; half morocco, $7.50.

The most important addition to the last edition of Scudder's valuable work is the chapters on the operative treatment of fractures, on fractures of the skull, on old fractures of the nasal bones, fractures of the spine, excision of the shoulder-joint, damage to the musculospiral nerve, fractures of the neck of the femur, old fractures of the lower end of the tibia, and injury to the lower tibial epiphysis. Scudder has added what has seemed to him of proven value in the past three years. The book, like its predecessors, is beautifully printed and illustrated, and constitutes a most valuable book of reference on the subject of the treatment of fractures.

APPLIED ANATOMY AND ORAL SURGERY FOR DENTAL STUDENTS. By Robert H. Ivy, M. D., D. D. S., Assistant Oral Surgeon at the Philadelphia General Hospital; Assistant Surgeon, Out-Patient Department, University, Philadelphia. Illustrated. Philadelphia and London: W. B. Saunders Company. 1911. Price, $1.50.

As the name implies, this small monograph is primarily intended for dental students, partially for the purpose of reviewing the anatomy of the face, the jaws and the anterior portion of the neck, and partially for the purpose of serving as an adjunct to the lectures on surgery. The various subjects are well considered and, as a whole, the work deserves to be recommended. It does not by any means supplant the larger works on oral surgery; however, even the general surgeon may find within its pages some special information in regard to the oral tissues which may be of benefit to him when he invades this special field of operative procedure. Numerous illustrations are added to elucidate the author's methods. The book is well executed from a mechanical point of view.

L'ANESTHESIE LOCALE EN DENTISTERIE OPERATOIRE. La Novocaine. Par Ch.—J. Fleischmann. Avec une préface de M. le Dr. J. Tellier. Paris: Octave Doin et Fils. 1911.

This interesting monograph represents primarily an extract of Fischer's well-known work, "Die Lokale Anaesthesie in der Zahnheilkunde," which appeared less than a year ago and which already has been published in its second edition. Fleischmann's epitome furnishes concise and practical information in regard to the application of local anesthesia in dentistry, and all those who are interested in this particular branch of surgery will profit from a careful perusal of its pages.

BOOKS RECEIVED

WALSH'S PHYSICIANS' COMBINED CALL-BOOK, TABLET AND DOSE-BOOK. Washington, D. C.: Ralph Walsh, M. D. Price, $1.50.

WALSH'S PHYSICIANS' HANDY LEDGER. A Companion to Walsh's Physicians' Combined Call-Book and Tablet. Washington, D. C.: Ralph Walsh, M. D. Price, $3.50.

THE DANGEROUS AGE. Letters and Fragments from a Woman's Diary. Translated from the Danish of Karin Michaelis. New York: John Lane Company. 1911. Price, $1.20.

VORLESUNGEN UEBER HARNKRANKHEITEN. Fuer Aerzte und Studierende. Von Dr. C. Posner, A. O. Professor an der Kgl. Friedrich Wilhelms-Universitaet zu Berlin. Berlin: August Hirschwald. 1911. Price, 9 m.

A MEMOIR BY SIR SAMUEL WILKS, BART., M. D., LL. D., F. R. S. On the New Discoveries or New Observations made during the time he was a Teacher at Guy's Hospital. London: Adlard and Son. 1911. Price, 3s. 6d.

MEDICAL REVOLUTION. A Plea for National Preservation of Health Based upon the Natural Interpretation of Disease. By Sydney W. Macilwaine, M. R. C. S., L. R. C. P. (Retired). London: P. S. King & Son. 1911. Price 2 s. 6 d.

DAS KIND. Seine koerperliche und geistige Pflege von der Geburt bis zur Reife. Zweite Auflage. Zwei Baende. Herausgegeben von Prof. Dr. P. Selter, in Solingen. Mit 152 Abbildungen im Text. Stuttgart: Ferdinand Enke. 1911.

THE MIND OF PRIMITIVE MAN. .By Franz Boas. A Course of Lectures delivered before the Lowell Institute, Boston, Mass., and the National University of Mexico, 1910-1911. New York: The Macmillan Company. 1911. Price, $1.50.

DIE ARZNEIMITTEL DER HEUTIGEN MEDIZIN. Mit Therapeutischen Notizen zusammengestellt fuer Praktische Aerzte und Studierende der Medizin. Von Dr. Otto Dornblueth, in Wiesbaden. Elfte Auflage. Wuerzburg: Curt Kabitzsch. 1911. Price, 7.60 m.

THERAPEUTIQUE USUELLE DU PRATICIEN. Par Albert Robin, Professeur de Clinique Thérapeutique à la Faculté de Médecine de Paris. Membre de L'Academie de Médecine. Deuxième Série. Clinique Thérapeutique de la Faculté de Médecine de Paris, Hopital Beaujon. Paris: Vigot Frères. 1911. Price, 8 fr.

DISEASES OF THE STOMACH. A Textbook for Practitioners and Students. By Max Einhorn, M. D., Professor of Clinical Medicine at the New York Post-Graduate Medical School and Hospital; Visiting Physician to the German Hospital. Fifth Revised Edition. New York: William Wood and Co. 1911. Price, $3.50.

A MANUAL OF FEVERS. By Claude Buchanan Ker, M. D. (Ed.), F. R. C. P. (Ed.), Medical Superintendent, City Hospital, Edinburgh, and Lecturer on Infectious Diseases to the University of Edinburgh, Author of "Infectious Diseases: A Practical Textbook." New York: Oxford University Press. 1911. Price, $2.50.

UEBER DEN SELBSTMORD INSBESONDERE DEN SCHUELER-SELBSTMORD. Diskussionen des Wiener psychoanalytischen Vereins. Herausgegeben von der Vereinsleitung. I. Heft. Beitraege von: Dr. Alfred Adler, Professor S. Freud, Dr. J. K. Friedjung, Dr. Karl Molitor, Dr. R. Reitler, Dr. J. Sadjer, Dr. W. Stekel, Unus multorum. Wiesbaden: Verlag von J. F. Bergmann. 1910. Price, 1.35 m.

LEHRBUCH DER SAEUGLINGSKRANKHEITEN. Von Prof. Dr. Med. et phil. Heinrich Finkelstein, Privatdozent und Oberarzt am Waisenhaus und am Kinderasyl der Stadt Berlin. Zweite Haelfte, Abteilung II. Berlin: Fischer's Medicin Buchhandlung H. Kornfeld. Price, 4 m.

DIE NEUE WELT DER FLUESSIGEN KRISTALLE. Und deren Bedeutung fuer Physik, Chemie, Technik und Biologie. Von O. Lehman, Professor der Physik an der Technischen Hochschule zu Karlsruhe. Mit 246 Abbildungen im Text. Leipzig: Akademische Verlagsgesellschaft m. b. H. 1911.

MINOR AND EMERGENCY SURGERY. By Walter T. Dannreuther, M. D., Surgeon to St. Elizabeth's Hospital and to St. Bartholomew's Clinic, New York City; Ex-House Physician and Surgeon, Jersey City Hospital, etc. Illustrated. Philadelphia and London: W. B. Saunders Company. 1911. Price, $1.25.

THE JUKES. A Study in Crime, Pauperism, Disease and Heredity. By Robert L. Dugdale. Fourth Edition. With a Foreword by Elisha Harris, M. D., Corresponding Secretary Prison Association, and an Introduction by Franklin H. Giddings, Professor in Columbia University. New York and London: G. P. Putnam's Sons. 1910.

MANUAL OF PHYSIOLOGY FOR STUDENTS AND PRACTITIONERS. By H. Willoughby Lyle, M. D., B. S. (Lond.), F. R. C. S. (Eng.), Assistant Ophthalmic Surgeon to King's College Hospital, Surgeon to the Royal Eye Hospital, etc. With one plate and 135 figures in the text. New York: Oxford University Press. 1911. Price, $4.00.

TUBERCULOUS DISEASES OF BONES AND JOINTS. Their Pathology, Symptoms, and Treatment. By Sir W. Watson Cheyne, Bart., C. B., F. R. S., F. R. C. S., D. Sc., LL. D., etc., Professor of Clinical Surgery at King's College Hospital, Senior Surgeon to King's College Hospital, etc. New York: Oxford University Press. 1911. Price, $5.50.

CRIME AND INSANITY. By Charles Mercier, M. D., F. R. C. P., F. R. C. S., Physician for Mental Diseases to Charing Cross Hospital, Visitor to the State Inebriate Reformatory. Author of "Sanity and Insanity," "Psychology: Normal and Morbid," "Criminal Responsibility," "A Textbook of Insanity," etc. New York: Henry Holt and Co. Price, 75 cents.

OPERATIVE OBSTETRICS INCLUDING THE SURGERY OF THE NEWBORN. By Edward P. Davis, A. M., M. D., Professor of Obstetrics, Jefferson Medical College; Obstetrician to the Jefferson Hospital, Obstetrician and Gynecologist to the Philadelphia Hospital, etc. With 264 illustrations. Philadelphia and London: W. B. Saunders Company. 1911. Price, $5.50.

THE DIAGNOSIS OF NERVOUS DISEASES. By Purves Stewart, A. M., M. D. Edin., F. R. C. P., Physician to Out-Patients at the Westminster Hospital; Joint Lecturer on Medicine in the Medical School; Physician to the West End Hospital for Nervous Diseases, and to the Royal National Orthopedic Hospital; Consulting Physician to the Central London Throat Hospital. Third Edition, revised and enlarged. New York: E. B. Treat and Co. 1911. Price, $4.50.

CASE HISTORIES IN NEUROLOGY. A Selection of Histories Setting Forth the Diagnosis, Treatment and Post-Mortem Findings in Nervous Disease. By E. W. Taylor, A. M., M. D., Instructor in Neurology, Harvard Medical School; Assistant Physician, Department of Neurology, Massachusetts General Hospital; Visiting Neurologist, Long Island Hospital, Boston. Boston: W. M. Leonard. 1911.

ORTHOPEDIC SURGERY. By Edward H. Bradford, M. D., Surgeon to the Boston Children's Hospital; Consulting Surgeon to the Boston City Hospital; Professor of Orthopedic Surgery, Harvard Medical School, and Robert W. Lovett, M. D., Associate Surgeon to the Boston Children's Hospital; Surgeon to the Infants' Hospital, the Peabody Home for Crippled Children and the Massachusetts Hospital School for Cripples; Assistant Professor of Orthopedic Surgery, Harvard Medical School. New York: William Wood and Co. 1911. Price, $3.50.

Interstate Medical Journal.

EDITORIAL.

HENRY LABOUCHERE.

To those American physicians who have read London *Truth* only oc-
casionally, or for that matter have never read it at all, the death of its
distinguished editor will mean nothing; but, on the other hand, to those
in the ranks of our profession who have delighted in its criticisms of
art, literature, snobbery, and, especially, quacks and nostrums, the demise
of Henry Labouchere will make them deeply regret that this personifica-
tion of fearlessness has been stilled for ever. Judged by American
standards, Henry Labouchere's life was not a successful one; for though
his paper was a success, he must have alienated the affections of many
by his indomitable courage, and—again we are thinking of our false
standards—if a man fears not how many enemies he makes, and at the
close of his days his enemies outnumber his friends, can it be said that
his career was as successful as is that of him who is continually prating
about his innumerable friends to illustrate his charm and fascination as
an out-of-the-ordinary man? And just because our standards are so very
queer, we have no Henry Laboucheres: men who wield a vitriolic pen in
clean hands. Of course, we have the sort who are every ready to expose
and denounce in no uncertain terms; but their burning words do not
burn deep into the public conscience, for their ideals are never so high but
they can be questioned, their motives are not so pure but someone can
pinprick them easily, their past is not so clean but someone can raise the
curtain and show the sordid spots that spell uncleanliness.

It would be a long chapter to recite the good deeds of the editor who
has just laid down his pen; but, without boring the reader with details,
mention should be made of the valiance which he showed on all occa-
sions in his fight against quacks and nostrums. Henry Labouchere had

no affiliations with medicine, but he had that supreme quality which recognizes that wrong must be worsted if this world is to be a fit place for those who believe in righteousness. And when he looked around and saw the cesspools which were defaming the science of medicine, he did not appeal to any medical editor for assistance in his fight against these outrages, but went about obliterating them single-handed. How he accomplished as much as he did is not within the knowledge of the writer of these lines; but, without casting any reflection on what the editors of the leading medical journals throughout the world have attempted in this matter, it can be stated without prejudice that their efforts have been those of a weakling compared with what the late editor of *Truth* undertook and carried to success. Not a week passed but some charlatan, no matter if he held the highest medical degree England could bestow, was haled to the court of inquiry instituted by Labouchere, and was so thoroughly grilled that not much was left even of his dubious reputation. And the same treatment obtained when a nostrum fell under his searching gaze; not a proprietary preparation that in this country excites so much venomous and unnecessary wrangling among editors of medical journals, but the sort that is put forth by rascals who prey on the weakness of the public, knowing full well that the greatest defect in human nature is the longing for a panacea to cure all ills.

We often point with pride to this or that editor of a medical journal, because we feel that in his work for the uplift of the medical profession he is a doughty fighter; we do this because we firmly believe that our support will be beneficent and strengthening; but can our allegiance be unwavering when arbitrariness mars his pleas for purity, when his earnestness is weakened by a narrow-mindedness that is born, not only of a lack of true culture, but of a point of view that is purely personal? Such misguided autocracy was never the note in any of Labouchere's writings; and though at times the mordancy of his pen may have been too unmerciful, his ideal of what should obtain in the social fabric of to-day was never lost sight of; hence, no accusation of a personal grudge on his part against this or that offender could be raised.

THE DICHOTOMY PERIL.

Readers of general literature are more or less acquainted with those formidable terms, Yellow Peril, Red Peril, and so forth, and are wont to grow quite excited when discussions are on as to what poor humanity will do when a sweeping dash is made by them into our well-ordered society. But while medical readers may or may not be "emotionalized"

into hysterics by the mere mention of these perils, the one that takes them out of themselves, places them so to speak in that realm of thought which wots not of sanity, is the Dichotomy Peril, which already is being so freely discussed in the lay press that the public is no longer ignorant of the reasons why the very foundation stones of medicine are wobbling. The *New York Herald,* in a recent issue, published an exposé of the dire situation, and in the naïve manner so characteristic of the New York papers stated that fee-splitting was quite unknown in the Eastern states, but was prevalent enough in the West to cause grave comment. Whether or not the writer meant this fling as a *jeu d'esprit,* we do not know; but what we do know is that his whitewashing the East and blaming the West goes to show that his understanding of human nature is quite limited.

How this matter of fee-splitting arose, by what devious ways it finally arrived at its present formidable growth, would be footless to expound; nor would one out of ten readers agree with us were we to advance, with every show of reason, the causes, as we conceive them, for the luxuriance of this Canada thistle in our garden of blowing roses and lilies. But, at the present moment, the thistle is about as full-grown as it possibly can be, and though the physicians in our Eastern states may shriek from the house-tops that guilt should not be visited on their heads, since purity is the hall-mark of their careers, the fact remains that the practice of fee-splitting is quite democratic, and houses just as comfortably with the elect in the medical profession as with the rank and file, just as readily on the Atlantic seaboard as in the Middle West and the far West. Even Paris, representing the best and most enlightened thought of France, if not of the world, is not without this menace against probity and uprightness; for were it otherwise would the management of the Vaudeville theatre have accepted Dr. Henri de Rothschild's play "Le Caducée," which is a searching inquiry into the evils of dichotomy?

To throw the blame for an inroad into medical integrity on any one section of the country is by no means explaining how a hydra-headed monster arose and just what means should be used to vanquish it. If its birth was the outcome of a lust for money,—and social philosophers in their criticisms of our sociology have dwelled time and again on this defect in our economics,—great blame attaches to those in the medical profession whose cupidity is their outstanding quality. But, on the other hand, if the conditions are such in this country and also in Europe that the lesser man cannot eke out a living—a real living not a bare sub-sistence—unless he commercializes his calling, then the conditions should be investigated, and some reform instituted so that all professions may retain their purity. The practice of medicine, save in our modern novels,

is a means to an end; and surely the end is something better than a work-man's wage. Even a workman's wage would not be so despicable if the physician were not compelled to keep up appearances: not a carriage and four, or a motor-car, as we have it to-day, but decent dress, decent offices and a decent manner of living, so that the head can be held high and courage does not falter. Now we take it that this matter of fee-splitting must have started with the men who wanted all this before time and patience would grant it, and not seeing it forthcoming angled about for the wherewithal to gratify their desires. They could not en-gage in the selling of merchandise as an adjunct to the practice of medicine, for that indeed would bring them into bad repute; but having the shrewdness which is born of keen desire, they thought the easiest way out of their financial difficulties was to imitate the methods of the business man—buttonhole a confrère, make overtures, and play on the weakness of human nature. And thus, we imagine, this blight started, but was that any reason for those in power to imitate?

MONA LISA IN THE LIGHT OF MEDICAL SCIENCE.

Nowadays there is such a close connection between medicine and all the other arts that it is not surprising that the distinguished lady who once rested so safely in the precincts of the Louvre, but who had the bad grace to allow herself to be stolen, should, now that she is notorious, be subjected to all manner of criticism from people in all grades of society and in all professions. Those of us who know Walter Pater may recall his glowing lines to the effect that "it is a beauty wrought out from within upon the flesh, the deposit, cell by cell, of strange thoughts and fantastic reveries   .   .   .   the embodiment of the old fancy, the symbol of the modern idea," as well as other tributes equally appreciative. But encomiums wear well for time, but not for always, and the spirit of the age being opposed to hero- or heroine-worship, it ill becomes us to prostrate ourselves before any work of art before ascertaining whether the subject is worthy of our consideration. It may be thought by the guileless that the art critic is the man to tell us whether or not to halt in front of a masterpiece and allow our enthusiasm full rein, but what folly when at our very doors is scientific criticism with its ramifications into all the 'ologies, especially neurology. Yes, truth to tell, we are no longer enthralled in the puerilities of what was criticism some twenty years ago, for are we not the "eugenical" sons of perfect sires, who would rather ferret out what is pathological in a painting than allow our senses to be swayed by technique, color, and that something which only

a master-painter knows how to impart to his canvass? This state of mind must surely have been that of the French physician, who recently wrote a long article for a leading Paris daily in which he showed his displeasure at an easy-going world for burning incense before "the Lady Lisa," who undoubtedly had rickets, a contracted pelvis, dystocia; in short, was the sort of monster to engage the attention of teratologists!

No doubt the reader of this startling accusation against what has generally been accepted as the most perfect portrait in the world will allow his outraged artistic feelings to embroil him in controversy, especially when he learns, as we are about to inform him, that the pathological condition of Mona Lisa was arrived at by the French physician by the peculiarities of the lady's forehead, the length of her nose, and the contour of those lips which have never been mentioned by art critics and essayists save in connection with their disturbing characteristic— the inscrutable smile. But though his indignation may be rampant, he should allay his turbulence at once, for already a champion has entered the lists—no less a man than Professor Paul Lequeux, the well-known gynecologist, who effectively combats all these theories in an exhaustive article, entitled "Mona Lisa Etait-Elle Rachitique?" which appeared in *Aesculape* for November, 1911. To quote Professor Lequeux: "What a mistake it would be for any physician to judge the size of the pelvis by the form of any part of the face. This sort of reasoning would take us back to the time when Weber advanced the idea that the length of the nose was proportional to the true conjugate, and we all know what surprises were in store for the examining physician when he had this thought in mind. A woman who had dystrophia to excess, whose limbs were twisted like the branches of an oak, showed a sacral promontory but slightly projecting; another, whose deformity was hardly marked, had a pelvis that was greatly contracted. . . Now what do we see in the face of Mona Lisa? No Olympian forehead, but one that is straight and regular; no exaggeration of the frontal eminences, but a slight shadow in the temporal region; no nasal deformity, but a nose straight and regular; no maxillary prognathism, but a slight fullness of the cheek such as one always sees in a face that is not thin and, especially, in the face of an Italian woman at the age of twenty-five; no projection of the bones of the face, but contours that are regular and pleasing. . . No, Mona Lisa is not from any point of view rachitic; her face, her neck, her throat prove the contrary. She does not even bear a slight resemblance to those women of Southern Italy, who, on account of ethnic characteristics, sometimes deceive the superficial observer into thinking that they are slightly dystrophic."

Now, though what the French gynecologist says in rebuttal of his con-frère's onslaught is quite convincing, it would be well for physicians who are contemplating the purchase of a copy of the now-famous picture for their offices—and their name is legion—to defer the outlay of money for a short space of time if possible—that is until the seething waters of controversy are stilled—lest by their eagerness they fall into the trap of buying something that is so objectionably pathological that offense will be given to their patients, inured as they must be to those time-honored wall-decorations—Rembrandt's "Lesson in Anatomy" and Fildes' "The Doctor." The modern physician certainly knows the effect of inartistic and grotesque wall-paper on the sensitive nerves of many of his patients; he knows, or he ought to know, how soothing his Rembrandt and his Fildes have been in the past; and with this knowledge, will he be so fool-hardy as to introduce into his limited gallery of masterpieces the face of one who has but lately been held up to opprobrium for being "an achon-droplasiac dwarf, an atrophic and distrophic rachitic, or a monster more horrible"?

OPINION AND CRITICISM.

THE BROADENING INFLUENCE OF MEDICAL SOCIETIES.

That a medical society need not necessarily limit itself altogether to the reading and discussion of papers that are purely medical, with no thought of the manifold interests outside medicine, has for some years been the thought of the choice spirits in our organizations; but such has been the adherence to the beaten path that small progress has hitherto been made in bringing to the notice of medical men the importance of widening the field, so that the inclusion of socio-medical subjects might be possible. That the old order is changing is evidenced in more than one society to-day, with the result that a closer and closer juxtaposition with the spirit of the times is being effected. We may scoff at this tendency; we may say that a medical society was never intended for such purposes; but all our scoffing and all our unfriendly criticism will eventually make us shamefaced, for if we have the power to see clearly what can be seen by anyone with ordinary vision, our judgment must be greatly amiss if it fails to read progress, enlightenment and instruction in what is being done to-day by the advance-guard of our medical societies.

We do not know the weekly programs of all the leading medical societies in this country, for to follow them would certainly entail herculean effort. But if any society has a more liberal program than the St. Louis Medical Society, knowledge thereof has not come within our ken. To our way of thinking the year 1911-1912 will be red-lettered in its history, what with its open-door policy and the catholicity of the papers read. A mere glance at what the near future holds for its members conveys at once the idea that all tastes have been consulted, and all narrow-mindedness has been abolished. Not only have all members been placed on an equal basis, as regards opportunities to read papers and present pathological specimens, but non-medical men have been asked and have willingly accepted to enter this medical arena to discuss subjects which are germane to the science of medicine as interpreted to-day.

The fruits of all medical societies, the doors of which are open to educators and men of science whose work is interrelated with medicine, will be those of wisdom, for by this sort of alliance a broadening of the medical mind will obtain, and certain matters which have long been misinterpreted by the lay mind will receive the right impetus toward a correct solution. That the science of medicine, by reason of its ramifications, is to-day more of a social science than it was a decade ago is apparent to all of us; but what is not so apparent is the importance of a

medical interpretation of the majority of the social problems in which the lay world is deeply interested. This interpretation, to be effective, must be brought home to the lay mind in language that does not bristle with medical technicalities, for only then will clarity come out of chaos. But what is still a better point, in the *rapprochement* which we are advocating, is the fact that by the open-door policy members of medical societies, no matter how deeply engrossed they may be in their studies, will learn that they have received a "call" to assist in the clearing away of debris from matters which really concern them.

LITERARY NOTES.

In "Queer Patients" by M. Oston, M. D. (John Currie, Edinburgh) the physician, whose readings extend beyond his textbooks, will find quite a number of readable stories which make appeal more on account of their truthfulness than on account of their literary quality. The latter is not altogether wanting, however, for the author possesses a style that has much to command it on the score of directness and the absence of a desire to swamp the reader with unnecessary words. To write a medical story with due regard to the canons of truth is no easy matter, for the temptation is always present, even with medical writers who should know better, that something out of the ordinary must be done to engage the reader's attention; hence, it happens only too often that the author's imagination runs amuck. Now Dr. Oston does not belong to this class of writers; his soberness, his sanity, and his paucity of words are his best assets. The first story—told in some twelve pages—is one of the best, for it is just the sort of chapter in psychology that the busy practitioner overlooks when his pills and draughts somehow fail to effect a cure. Its title, "A Mere Detail," carries a weight of meaning, since the detail in the case—a mere matter of wall-paper—plays a most important part in causing nervous instability. The other stories are not without merit; each one bears the impress of deep thought; and each one makes the sort of reading that cannot but bring profit to the reader.

In the *Mercure de France* of July 16th, 1911, there appeared a highly interesting article by Dr. Paul Voivenel, Physician-in-chief of the clinic of the Toulouse Faculty, on disease as an incentive to literary inspiration as shown in the works of various writers who, whilst their books were in the making, were suffering either from a slight mental defect, complete insanity, epilepsy, or even general paralysis, and really owed the unwonted brilliance of their productions to the momentary excitation caused by their disequilibrium. According to Dr. Voivenel, what is generally called

"inspiration" is, in quite a number of instances, the outcome of psychical stimulation brought on by mental instability or artificial means. Thus, in the case of Dostoïevsky and Flaubert, epilepsy increased the sufferings of the former and intensified the realism of his books; while the latter was so sensitive on account of his ailment that when he wrote the poison scene in "Mme. Bovary" he tasted the poison to such an extent that he vomited repeatedly. Jean Jacques Rousseau was the victim of the delirium of persecution, and it was really on account of mental abnormalities that his writings have the distinctive note which even to-day marks them as something apart in literature. Auguste Comte, Robert Schumann, Hugo Wolf, and Gerard de Nerval, all of whom died insane, had periods in their careers when their feverish exaltation resulted in works of outstanding quality. Goethe himself, the one man of genius who has always been regarded as sane, was, according to Dr. Voivenel, extremely nervous. If we are to believe the studies on his psychopathology recently published in Germany, the author of "Faust" suffered from melancholia, which was brought on by excesses, not only of an intellectual character, but of the baser sort—drink and venery, was extremely changeable and easily flew into a passion, was superstitious and mystical, had visions, and, similar to Musset and Maupassant, presented the phenomenon of autoscopy.

———

The tendency to-day, even among those physicians who enjoy the reputation of being men of excellent judgment, is to be just a little too enthusiastic, just a little too closely wedded to their special dietary theories. This tendency can lead only to one thing—to extremes which soon deteriorate into fads. How often have medical men laughed to scorn this or that visionary idea of the nutarian, the fruitarian, the vegetarian, the sour-milk enthusiast, the grape-eating votary, little thinking that all this balderdash arose from a germ which in their enthusiasm for a special diet they implanted in the unthinking minds of their patients! Now, if this were not true, books of the nature of "Common-Sense Dietetics" by C. Louis Leipoldt, F. R. C. S. Eng. (Williams and Norgate, London) would not be written for the profession, nor would others of lesser importance be the order of the day. We say "lesser," not because we wish to convey any reflection on books of a similar nature, which have heretofore come to our desk, but to emphasize, for the sake of all physicians, that if they wish to know what common sense is in the matter of dietetics, no better authority can be consulted than the author under consideration. One quotation which the author uses, and which in reality is the key to his book, is the very apt aphorism of Dr. Mouffet— "There are some that go to extremes in the matter of diet. Take care that they lead you not away from soberness nor tempt you to undue austerity;" and, by having this always before him while reading, the phy-

sician will not only thoroughly understand the author's point of view, but will continually guard his judgment against any inroads that his own faddy notions may wish to incur. Sincerity is the note of this book, and what with the pleasant conversational style and the unostentatious erudition, as evidenced in nearly all the chapters, but especially in the chapter on "The Art of Dining," we have in our possession to-day a valuable addition to the limited number of books which will bear re-reading.

————

The matter of hygiene and public health is at present so important a subject to all physicians, that even when a book, such as "Hygiene and Public Health" by Arthur Whitelegge, C. B., M. D., and George Newman, M. D., D. P. H. (Funk and Wagnalls, New York), is addressed to the English public, it cannot fail of interest to the American physician. While the laws governing hygiene in this country may differ from those in England, the problems are not dissimilar; and, this being so, a comprehensive view, no matter to what audience addressed, may bear fruit in showing another country just what is being effected to better conditions. Anyone reading this exhaustive study must recognize how the matter of public health, as it pertains to preventable diseases, is encompassing the thought of to-day, and what measures are being enacted, not only to instruct the physician but the great public which must no longer remain in ignorance of what the medical profession is striving for. Particularly good are the chapters on "Removal of Refuse," "Specific Disease," and "Schools and School Hygiene"; but these are pointed out not because they shine by contrast with the other chapters, but because, we take it, the general practitioner knows more, or wishes to know more, of these subjects than of the other topics contained in this book. Of course, the by-laws and regulations, mentioned by the authors, apply only to England, but even so, the American physician might profit by conning them with great care.

ORIGINAL ARTICLES.

CHRONIC INFECTIOUS ENDOCARDITIS, WITH AN EARLY HISTORY LIKE SPLENIC ANEMIA.*

By Sir William Osler, Bart., M. D., of Oxford,
Regius Professor of Medicine, Oxford University.

This patient, under the care of my colleague, Dr. Brooks, illustrates a remarkable and important type of endocarditis, the diagnosis of which, in its early stages, presents unusual difficulties. How serious its difficulties are you may judge from the fact that of 10 cases which I reported in 1909 (*Quarterly Journal of Medicine*, Vol. 2), in not one was the nature of the disease recognized for weeks, and sometimes for months after the onset of the symptoms.

This robust looking man, aged thirty-three, the healthiest looking man in the wards, was sent in last May by Dr. Waters with purpura and anemia. He had not been very well for a month, but with nothing very definite, and he came on account of weakness and the spots on his leg. He looked bad, was anemic, with a swollen abdomen, puffiness of the ankles, and the legs thickly peppered with a fresh crop of purpura. The spleen was enlarged, reaching nearly to the navel; the liver was normal. There was a soft apex systolic murmur which we naturally associated with the anemia. He had a temperature of 102.5° F. The blood-count by Dr. Kemp showed, R. B. C. 2,700,000, hem., leucocytes 8,000; the differential count gave: polymorphs 40, large lymphocytes 45, small 13, myelocytes 2.

As it was not unusual for these so-called blood diseases to begin with purpura, I thought that the case was one of splenic anemia, to me, at any rate, a well-characterized type of disease with which the anemia is directly associated with morbid changes in the spleen. Upon this point I need not enter here, only to remind you that among growing evidences for the recognition of this entity is the fact that removal of the spleen is followed by permanent cure.

The patient remained in the hospital until August 22nd, during which time he had several attacks of purpura, but the general and blood conditions improved, and the spleen reduced slightly in extent. During his stay in hospital he had a daily rise of temperature, usually to 102.5° F.,

occasionally to above 103°. This, with the purpura, were points which I noted as unusual in any instances of splenic anemia that had come under my care. Then he went out for a few days, to return on August 26th.

Now we come to a totally different set of manifestations. As I told you, on admission he had a soft mitral murmur. This had increased, and within a fortnight there appeared a well-marked systolic murmur at the aortic region and, what is much more important, a soft diastolic murmur. A little before he left the Infirmary he had a severe pain in the left groin, and on his return a tender swelling was noticed in the region of the femoral artery just below Poupart's ligament. There was no interruption in the circulation in the leg, nor change in its color. The spleen was still enlarged, reaching more than a handbreadth below the costal border. The temperature was irregular and daily reached as high as 103° F. These features, of course, put an entirely different construction on the case, and it was evident that he had an infectious endocarditis with embolic features. Cultures were made from the blood by Dr. Gibson, from which have grown a streptococcus which has the characters of the form described by Libman in connection with these cases. I must say that this sequence of events was quite outside my experience, but there are one or two similar cases in the literature. Only the other day Dr. Parkes Weber, into whose clinical net come all sorts of peculiar and instructive cases, sent me a paper in which is described a case of malignant endocarditis, the early features of which resemble those of splenic anemia.* His patient was a man aged twenty-eight, who had been treated at several London Hospitals with a diagnosis of splenic anemia. In October, 1908, when admitted to St. Thomas' Hospital, the spleen reached half way between the navel and the pubes. He had had attacks of purpura, had had oozing of blood from the gums and slight epistaxis. In October he had a blood count of 3¼ millions, color index .9, and leucocytes 1,360. He came under Dr. Weber's care in July, 1909; he looked pale and wasted, with a remarkable pigmentation of the skin of the legs, due to repeated hemorrhages; the spleen was greatly enlarged, and the liver was enlarged. R. B. C.'s 1,700,000, leucocytes 1,900, color index .9. There was a loud systolic murmur at apex; he had an irregular fever, and died on July 29th. There was a remarkable condition of the heart, old thickening of the mitral valve to which was adherent a soft organized thrombus. Growing in the left auricle from the septum was a large endocardial excrescence 70 mm. in length by 35 mm. The spleen weighed 110 oz.

The patient before us has, as I remarked, an unusually healthy appearance. He has been on the "gallery" for some weeks, and looks not only sunburnt, but plethoric. Indeed, it is not often one sees a case in which the facies is so entirely misleading, or in which there is so striking a contrast between head and feet; for on looking at his legs, the first

*British Journal of Dermatology, February, 1910.

thing which attracts attention is the swollen edematous condition of his ankles, and up and down the skin of the legs are spots of fresh purpura. The abdomen is somewhat distended and the spleen is a full handbreadth from the costal margin. The apex beat is difficult to feel; there is no thrill; the cardiac flatness is increased to the left; there is a loud systolic murmur, and up and down the sternum a loud to and fro murmur which has increased in intensity during the past few weeks. Just below Poupart's ligament there is a wide area of pulsation, and there is to be felt a distinct aneurysmal dilatation in the vessel. The anemia has improved; R. B. C.'s 3,520,000, hem. 60 per cent., leucocytes 4,480.

As is usually the case great difficulty was experienced in getting subcultures of the patient's own streptococcus, so that he has had during the past three weeks repeated injections of another strain, with, I am glad to say, a considerable improvement, shown at any rate by a reduction in the fever. He has none of those peculiar, painful, ephemeral cutaneous nodules which I have described as almost pathognomonic of this form of endocarditis; but he has had one or two very peculiar areas of persistent erythema, one on the ulnar side of his left palm, and another on the under surface of the left big toe. The patient's appetite is good, and he feels very comfortable. There is a slight amount of albumin in the urine, and I forgot to mention that on admission he had a small quantity of blood in the urine.

There were one or two other interesting features in the case. In the middle of August he had a most extensive herpes on the right flank, the individual vesicles of which became purpuric. On several occasions he has had bleeding from the gums, and throughout the illness occasional outbreaks of purpura. At first the vaccine treatment, which was carried out by Dr. Gibson, seemed to reduce the fever, but subsequently it did not appear to have any special influence, and this accords with my previous experience, for I have not seen a case in which any permanent benefit has followed.

The patient died on the 13th, having had dyspnea for several days, but no increase in the fever. The cheeks and nose became covered with petechiæ, and shortly before death, which took place suddenly, there was paralysis of the right arm.

The post-mortem made by Dr. Gibson showed a very interesting combination of lesions, and the specimens are here for your inspection. He had, as you see, in the lungs a terminal miliary tuberculosis, the origin of which was determined to be a fresh tuberculous erosion of the thoracic duct from an adjacent lymph gland. The heart is large, particularly on the left side. The mitral valve has no vegetations. I would recall to your minds the fact that he had a loud apex systolic murmur, and a well-marked rumbling presystolic (Flint murmur). Two of the aortic segments present no single portion of normal valve, being covered with vegetations and erosions. There is a small patch on the ventricular wall

just below the aortic ring. The aorta itself is normal. In the left femoral artery there is a small aneurysm, the size of a walnut. The spleen is fully four times the normal size, and presents at its upper third this huge infarct, one of the largest I have ever seen, extending nearly through the organ and having a superficial area, the size of the palm of one's hand. These were the important lesions. The kidneys, as you see, are swollen and in a state of diffuse nephritis.

This patient's history extended over a period of between six and seven months, and the remarkable thing is that he should have at first presented the features of anemia. Some of you remember seeing him the day after his admission, when the pallor, the purpura, the big spleen seemed to point definitely to a blood disease. The heart was not enlarged, there was only an apex murmur such as one would expect in his state. He had one severe attack of abdominal pain about the end of July, which possibly may have been associated with this enormous infarct of the spleen. It was not really until his readmission that the nature of the case was settled by the occurrence of an embolic aneurysm in the femoral, and the appearance under observation of an aortic diastolic murmur. I confess I thought the mitral-valve segments were also involved, but the case only illustrates the fact that no intensity of systolic murmur, nor the presence of a presystolic rumble guarantees the existence of a lesion of these segments. They were in fact the not uncommon auscultatory signs at the apex associated with aortic insufficiency to which the late Austin Flint called attention.

Now briefly to summarize certain of the important features of this type of endocarditis:—

1. *Chronicity.*—Six, eight, ten, twelve, and even for thirteen months the symptoms may persist and there are instances of even longer duration. It has been well called, endocarditis lenta.

2. *Latency.*—For months there may be no indication whatever of endocarditis. I mentioned at the Birmingham meeting of the British Medical Association, in the discussion on obscure types of fever, a case which I had seen recently with Dr. Relton of Rugby, in which fever had persisted for six or seven months,—fever and nothing else, and the diagnosis was not possible until the cardiac signs became pronounced.

3. *The fever* is of the so-called septic type, the daily rise reaching to 102.5° or 103° F. Month after month it may not vary the fraction of a degree. The most remarkable record I saw was in the first case of this kind I reported,—a patient of Dr. Mullin's of Hamilton, whose sister, a trained nurse, had lined the walls of the room with a temperature chart extending over a period of more than a year. Chills may occur at intervals, but the cases may run the entire course without them. A special septic feature of the disease is the anemia which in this case so early led us astray.

4. *Embolic attacks* which are present in a considerable number of

cases, and which may give the first intimation of the true nature of the trouble. In this case, it was the femoral aneurysm which at once suggested to Dr. Brooks the existence of endocarditis, and a few days later a murmur of aortic insufficiency was present.

5. *Ephemeral cutaneous nodes,* which are, I think, pathognomonic. They are small swollen areas, usually about the hands or feet; raised, reddish nodes, not unlike an ordinary weal, painful, but they disappear in the course of a day or two. Possibly the areas of persistent erythema, which this patient presented, may have been of embolic origin.

6. *Blood Cultures.*—In a majority of all cases, organisms are present in the blood, and may be grown on appropriate media. The studies of Schotmueller, Libman and others have determined that the common organism in this type of subacute infective endocarditis is a streptococcus, known as *mitior* or *viridans,* because the colonies are those of a poorly-growing organism and produce a green pigment on blood-plates. But not only this organism may be associated with these chronic cases, the influenza bacillus, the pneumococcus, and the staphylococcus may also be present.

7. Lastly the endocarditis is pathologically unlike the ordinary ulcerative form. There are usually large, firm, hard, greyish-yellow vegetations projecting from the valves like condylomata, and a special feature in many cases is their widespread extension on the mural endocardium.

A glance at the condition of these aortic valves neutralizes at once any disappointment one may feel at the failure of the vaccine treatment,—one cannot expect miracles.

REPORT ON VACCINE VIRUS AND ON THE RESULTS OF
VACCINATION IN THE PUBLIC SCHOOLS OF
ST. LOUIS, 1912.*

By George Dock, M. D., and Downey L. Harris, M. D., of St. Louis.

We desire this evening to report before this society the results of an
inspection of vaccination in the Public Schools of St. Louis made in
November, 1910, and in October and November, 1911. We have added
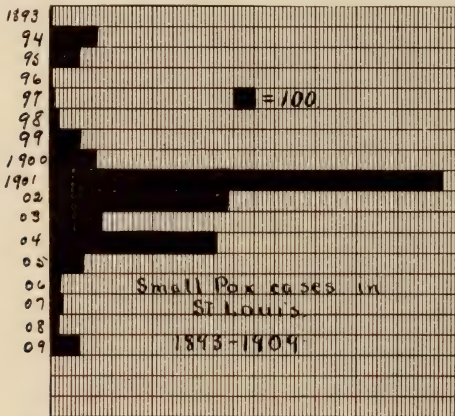
Fig. 1.—Diagram showing number of cases of smallpox 1893-1909. The large
number occurring in 1904 may be explained by the presence of visitors to the
World's Fair at that time.

to this a brief review of the Government rules and regulations governing
the production and sale of vaccine virus and four diagrams illustrating
(1) the prevalence of smallpox in this city, (2) the number of vaccina-
tions made and points supplied by the Health Department, (3) the pro-

portion of vaccinated to non-vaccinated among those attacked by small-pox, and (4) the years elapsed since the vaccination.

The inspection in November, 1910, was made at the request of the Health Commissioner and the Board of Education because an unusually large number of sore arms had resulted from the work done at that time. The results of this investigation were incorporated in a report made at that time and published in the Official Report of the Board of Education, Vol. XVII, pp. 353-355, December 13th, 1910. The report made a few days ago has not yet been printed.

Inasmuch as there is more or less repetition in the two reports, we shall give only such parts of the first as are necessary for a complete understanding of the second.

From an analysis of the bacteriological examinations of the virus employed, we stated that we were forced to conclude that the "sore" arms were not due to impurities of the points.

The following excerpts are from the first report:—

With the kind assistance of Dr. James Stewart and Dr. M. C. Woodruff, we examined the vaccinated children in twenty Public Schools, between November 7th and November 23rd.

The list of schools is appended, with the results of inspection in each one, and from this it will appear that we covered a large geographical area and were able to see the results of the work of all of the vaccine physicians, and also to observe the facts in all classes of the school population.

TABLE NO. 1.

	PRIVATE				PUBLIC			
	No Take	Pseudo	Takes	Infected	No Take	Pseudo	Takes	Infected
L'Ouverture...............	44	45	108	26	...	...	...	...
Cote Brilliante...........	18	2	78	3	...	...	...	...
Krafe School.............	...	2	17	...	...	...	...	...
Adams....................	5	10	84	9	23	10	12	3
Carondelet...............	...	3	32	14	3	...	1	...
Blow.....................	...	8	74	17	4	...	2	5
Des Peres................	1	3	23	4	2	...	1	...
Delaney (Colored)........	1	5	24	...	...	...	...	...
Alabama Avenue.........	...	2	22	4	3	...	...	1
Neosho Street.............	...	...	45	1	2	...	1	2
Mt. Pleasant.............	...	1	81	5	3	2	2	1
Meramec.................	3	3	47	8	3	2	1	2
Monroe...................	3	9	79	15	16	15	8	3
Peabody..................	2	7	48	3	7	5	3	1
Clinton..................	18	14	85	15	6	4	3	3
Carroll..................	1	1	3	...	1	...	...	...
Madison..................	4	...	74	2	...	...	...	...
Jefferson.................	7	9	20	2	...	...	...	1
Patrick Henry............	1	3	28	8	...	...	...	1
Marquette................	1	14	33	5	29	26	25	17
Total.................	109	141	1,005	141	102	64	59	39
Per cent..............	.07+	.10	.71	.10	.38	.24	.22	.10

The appended table (No. 1) shows that the results of the vaccinations, on the whole, were good. The proportion of "takes," *i. e.,* of operations indicating a high degree of protection against smallpox, is high.

A comparison of the results obtained here, with those we have personally observed from time to time in other large cities, convinces us that the work done in the Public Schools of St. Louis this fall is above the average in the United States.

It is possible to get nearly 90 per cent. of "takes" in secondary vaccination and about 97 per cent. of primary vaccinations. As we have com-
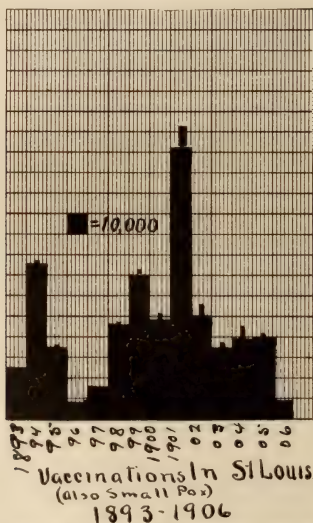
Fig. 2.—Diagram showing number of cases vaccinated and vaccine points given to physicians by the Health Department for 14 years. Since 1905 the Department has not issued points to physicians. The small superposed columns represent smallpox cases.

bined the two, it appears that the average, 71 per cent., is below the ideal. For those vaccinated the protection is, of course, good; but from the standpoint of prevention of smallpox, there is left an unprotected body of children large enough to be dangerous in time of epidemic.

The proportion of infected arms is higher than it should be, though the severity in a great majority of cases has been mild or moderately severe only. We have seen only 3 cases showing very severe infections. We missed seeing only a few, on account of absence from school at the hour of the visit, and could learn of no other severe cases.

We wish to point out that the estimate of the severity of an infection will often be exaggerated by the teacher. In many cases we were shown arms that were described as "terrible," etc., but which, on careful examination and investigation of the history, were found to be not extremely severe, much less dangerous. As an example of the ease with which such things may be exaggerated, we may mention a case in which a child was said to be too sick to attend school on account of a sore arm, but at the same time was playing all day long on the street. The number of children who lost even a day from school was small.

The proportion of unsuccessful vaccinations is higher than is desirable,

Never
Vaccinated 3346.

Good Scar 41.

Fair Scar 127.

Poor Scar 259.
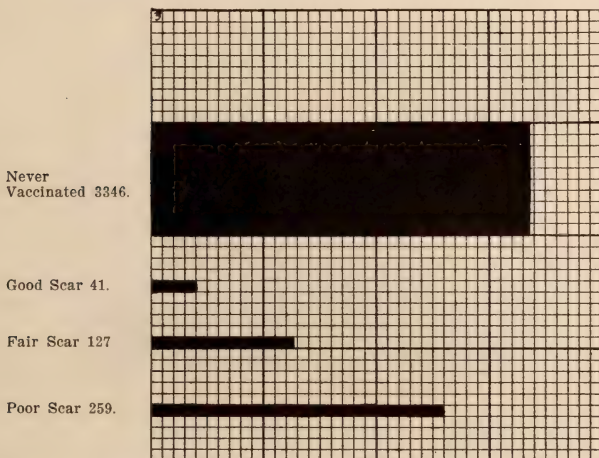
Fig. 3.—Diagram showing relation of vaccination to smallpox cases from 1901 to 1909.

and this is particularly so in the case of children vaccinated by physicians other than the representatives of the Board of Health.

The cases marked "No Take," numbering 109, or 7.8 per cent. in the cases of the Board of Health vaccinations, and 102, or 38 per cent. in the cases of private vaccinations, have, of course, no protection against smallpox. There is an idea that an unsuccessful vaccination means that the individual is resistent to the vaccine virus and, therefore, would be equally resistent to smallpox. This idea is almost entirely erroneous and in practice is very dangerous.

The cases marked "Pseudo" form a proportion larger than is desirable. In such cases we include all of the atypical lesions. A certain amount of immunity may be present, but this is very uncertain, and in most such cases is so small as to be useless in case of exposure to smallpox,

In regard to the infected arms, we have shown above that the vaccine material itself is not likely to be the cause. In practically all the cases the length of time after the operation at which the signs of infection began was so long as to indicate that the infection was due to accident from scratching or other injury. Very often it was assisted by dirty clothing, as could be observed in many cases. We shall allude to this again. In some cases gross neglect had been permitted in the care of the sores.

We beg to make the following recommendations:—

(1) That vaccination be resumed as soon as is practicable and completed with as much rapidity as is consistent with careful and thorough
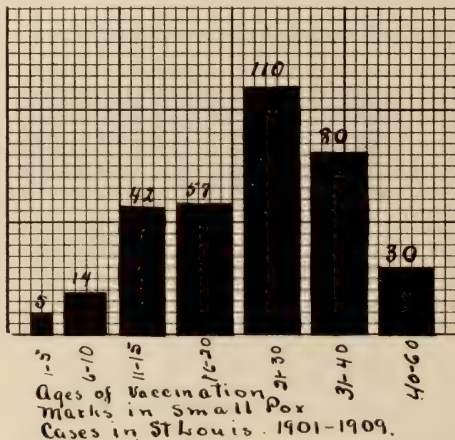
Fig. 4.—Diagram showing years elapsed since vaccination in smallpox patients from 1901 to 1909. This includes all except unsuccessful attempts made after exposure.

work. An effort should be made to complete the work before the middle of February, i. e., before the time of year when diseases, which are likely to complicate vaccination, begin to be prevalent, especially sore throat and erysipelas.

(2) That more frequent inspection be made. In order to be more sure of results and in order to lessen the danger of accidental infection, we think that all vaccinated children should be examined at intervals of not more than four days, either by school physicians or the Board of Health.

(3) Inspection should include vaccinations made by others than the Board of Health; because the observations that we have made show that

not enough care is taken in case of infection following private vaccinations, as well as regards the success of the operation.

(4) Greater care should be taken in regard to the cleanliness of the children and of their clothing. The parents should be notified in regard to these matters before the children are vaccinated, and very dirty children and those with dirty clothing should not be vaccinated until the conditions are improved.

(5) In case of infection, treatment should be carried out as soon as possible in order to shorten the course, and in the case of unsuccessful vaccination the operation should be repeated as often as practicable until success follows.

The second report of the inspection made in October and November, 1911, is as follows:—

Samples from every lot of vaccine purchased by the city since last August have been tested in the laboratory of the City Bacteriologist for the presence of contaminating bacteria. Tests were made both by artificial cultivation and animal inoculation. Five points or tubes were injected into a guinea-pig as a test for the presence of tetanus bacilli and other pathogenic organisms; other points were inoculated in media favorable to the growth of tetanus bacilli, and a third series of points were examined for the presence of pus-producing and other varieties of bacteria. None of these various examinations showed the slightest evidence of tetanus bacilli in any of the points. No streptococci have been found on any points. On two occasions the virus was declared unfit for use and was returned to the manufacturer.

Owing to the loss of potency in one lot of vaccine points and the unsuccessful attempt to vaccinate with them, it is now the rule to make periodic tests of the potency of the points.

These safeguards should, and we believe will, reduce the danger of infection from impure virus to a practical zero. Likewise the use of a point known to be effective for vaccinating guinea-pigs or rabbits should, and we believe will, give a maximum of successful "takes."

The list of schools inspected is appended. It shows that we visited eleven schools in various parts of the city, and examined 577 children vaccinated by the vaccine physicians of the Health Department, and 218 vaccinated by physicians in private practice. The results are given in tabular form (Table No. 2) and must not be considered by themselves, but with reference to vaccination in general.

The results of the operations done by the vaccine physicians of the Health Department are more favorable than those of last year in the proportion of successful vaccinations, the figures being 78 and 71 per cent. This is better than is often obtained in public vaccination in the United States, but falls short of the results in countries where vaccination has more care devoted to it than is the case here. The improvement over last year shows what can be done by experience and care, and we do

not doubt that each subsequent year will show further improvement. There is an even better showing in the number of wound-infections discovered,—1.7 compared with 10 per cent. The improvement cannot all be explained by greater purity in the virus used, but probably depends upon greater care in the operation and better care of the vaccinated children in their homes. When we consider the superiority of the Health Department vaccinations over those done in private practice as regards the number of "takes" and infections, we have striking testimony to the advantages of making vaccination an official operation. Practice makes perfect, and in contrast to the excellent public vaccinations, we find in several schools that the private operations by certain physicians are uniformly negative.

TABLE NO. 2.

	PUBLIC					PRIVATE				
	No Take	Pseudo	Good	Infected		No Take	Pseudo	Good	Infected	
L'Ouverture...	...	20	81	...	...	...	...	...	...	...
Dumas.........	6	27	43	...	...	...	...	...	...	...
Ashland.......	1	3	78	1	...	...	...	...	...	...
Cote Brilliant.	...	6	37	...	43	22	1	5	2	30
Pestalozzi.....	6	9	37	2	54	4	2	8	1	1
Lyon..........	3	1	38	4	...	12	...	12	2	...
Clay	2	3	24	2	...	4	1	2	...	...
Bryan Hill....	1	1	46	1	...	8	...	8	...	...
Marquette.....	6	2	17	...	25	26	1	13	...	40
Eugene Field..	15	1	5	...	...	27	1	14	1	...
Hempstead....	1	...	47	...	...	18	2	19	2	...
Totals....	41	73	453	10	No. of public cases 577.	121	8	81	8	No. of private cases 218.
Percentage	.07	.12	.78	.017	...	.55	.03	.37	3	...

The failures, comprising total failures and pseudo-vaccinia, are slightly more numerous in proportion than last year, 19.1 per cent. instead of 17.1 per cent. The stationary position of this class is probably related to weakness of virus. This can be improved by testing the virus before using it.

In the cases in private practice we find an improvement as regards "takes" over last year, the proportion being 37 to 24. The proportion of "takes" for this year, however, is still dangerously low, leaving 63 unprotected persons per 100, instead of 22 per 100 among those vaccinated by the Health Department.

The infections in this private series are less numerous than last year, though almost twice as numerous as in the public cases. The fact is still more noteworthy when we consider that the cases vaccinated privately are, on the whole, from families better able to care for and to keep

clean the bodies and clothing of the children and more able to protect them from accidental injury of the vaccine wounds.

We believe the character of the infections to be less severe than last year. There is still some misunderstanding on the part of teachers and parents in this important matter.

We heard of many cases thought to be severe, but on inquiry, found in every case nothing alarming. On the other hand, we saw several examples of infections much worse than should be permitted, and often grossly neglected and covered with filthy dressings. In many cases these things were observed in the children of relatively well-to-do families. In one private case we found a generalized vaccinia due to rubbing vaseline over the arm,—a dangerous practice.

In one school, learning of an unusual number of children "absent on account of sore arms," we made a visit to each house, twenty in all, and found not a single case of serious trouble due to vaccination. In two cases the children were playing in the street; in three there was no one at home, and in two other cases the families were off on excursions; two others had moved out of the city. One boy was believed by his father to have blood-poisoning from vaccination, but had in fact a condition wholly different and independent of vaccination, due to rheumatic fever contracted some months before. In another school a child was said to have a breaking-out following vaccination. We visited the child and found he and his younger unvaccinated sister had chicken-pox.

The inspections we have made for the last two years show the great advantage of public vaccination and should cause all who value freedom from smallpox to commend the work of the Board of Education and the Board of Health, and to give it every assistance. The regular vaccination of public school children is the most important prophylactic work done in the city. Records of the Health Department during the past year show the effect of smallpox appearing in the well-vaccinated public schools as compared to a similar occurrence in a parochial non-vaccinated school. The following letter from Dr. M. C. Woodruff describes the latter result:—

DR. G. A. JORDAN,   August 30th, 1911.
        Ass't. Health Commissioner,
                        City.
DEAR SIR:

On March 5th, 1911, M. J. was reported as having variola. Investigation confirmed diagnosis, and history showed eruption dated from March 1st; patient taken sick at a parochial school. Saw Sister Superior and made arrangement for inspection and vaccination March 6th.

Visited school for this purpose, and was told by the pastor in charge that we might vaccinate all that presented themselves, but would not allow inspection. As a result, no vaccination was done.

In view of the fact that I had no positive evidence of infection having been in the school, I did not insist.

On March 22nd, M. S. reported as suspect from St. Mary's Infirmary. In-

vestigation confirmed diagnosis as variola. Eruption appeared March 20th. Upon questioning her relative to source of infection, learned that her boy Raymond attended the parochial school and had a similar eruption some two weeks previous. Found this boy in the St. L. School, in infectious condition. Date of eruption could not be learned positively; from observation would fix it at March 1st. School was dismissed and posted. Saw the pastor in charge and informed him that we would now insist on taking charge of the situation and handle it to suit ourselves.

March 23rd fumigated school; March 24th made inspection of all pupils in school and all absentees; found enrollment of 480 pupils; 315 had never been vaccinated. We succeeded in vaccinating 285, the remaining 30 were vaccinated by outside physicians .

By following up all exposures and absentees, we uncovered in all 39 cases of variola among the pupils of said school up to May 10th.

<div align="center">

Respectfully,

(Signed) M. C. WOODRUFF,

Chief Vaccine Physician.

</div>

On the other hand, C. W., æt. ten, was taken down with smallpox at Poplar Bluff, Mo., October, 1910, and was quarantined for that disease by the local health officers. As soon as he was able to get up out of bed, the entire family, unknown to the authorities, moved to St. Louis and the boy was admitted to the C. School, October 11th. On November 11th he was transferred to the P. School, having attended school only four and one-half days during the month on account of illness. When he entered the latter school, November 14th, he was sent to the Health Department to be vaccinated, and it was there discovered that he was recovering from smallpox. Not a single case of smallpox occurred in any of the pupils of the C. or P. Schools as a result of this exposure.

During the years from April 1st, 1901, to March 31st, 1902, and April 1st, 1904, to November, 1910, 195 cases of smallpox have appeared among the school children of St. Louis. (The records of the years 1902-3 and 1903-4 were not available.) Of this number 45 were or had been in attendance at the public schools. Of these 195 children, only 3 had been vaccinated. One child, thirteen years old, had a "poor mark"; one, five years old, had a "good mark" (vaccinated in infancy); and the third, fourteen years old, had a "good mark" ten years old.

We cordially renew the recommendation we made last year, i. e., that vaccination of school children be continued; that it be made more general by the official vaccinators; that more pains be taken to inform parents of the objects of vaccination and the care of vaccinated children.

We had frequent occasion to see children excused from vaccination and feel that some comments upon the custom are warranted. In too many cases children are given excuses for trivial reasons. When we realize that the perfection of smallpox immunity depends upon the greatest extent of perfect vaccination, physicians should not add baseless physical objections to the sentimental objections of parents. We found strong and healthy children with excuses alleging ill-health. One child

had a certificate from her father, an osteopathic practitioner, giving "nervousness" as an excuse. The child was the victim of very large tonsils and adenoids, not only a source of much more serious danger than vaccination, but also a well-recognized cause of backwardness in school work. Sometimes previous smallpox was alleged without evidence in the form of scars. On the other hand, some cases are vaccinated that should be excluded, such as those of eczema, in which there is danger of generalized vaccinia, or patients with subacute arthritis and endocarditis.

We think there is too much dependence upon the immunity to smallpox in cases in which vaccination is negative. This is just as untrue and may be more dangerous than the opposite error that thinks a very sore arm proof of high protection. Combined with this is very often neglect of infections when they do occur.

In this connection we wish to warn against the custom of vaccinating on the leg, which seems to be on the increase. In one school we found seven such operations had been done, all in private practice, and five of them unsuccessful. The danger of accidental injury is almost always greater in the case of vaccination on the leg, and the custom in general is one that cannot be defended.

We found this year, as before, that much harm was being done by various forms of protectors, such as celluloid shields, bunion plasters, etc. These should all be excluded. On the other hand, the sewing of a clean piece of muslin in the sleeve, sometimes done by mothers without being told, is to be encouraged.

In order that physicians may be in a position to reply intelligently to some of the misrepresentations of the antivaccinationists, it seems an appropriate occasion to refer briefly to the control exercised by the Government over the production of virus intended for interstate traffic.

An Act of Congress approved July 1st, 1902, provides that the Surgeon General of the Army, the Surgeon General of the Navy and the Supervising Surgeon General of the Marine Hospital Service shall constitute a committee to promulgate rules under which licenses may be issued for the propagation and sale of virus. The regulations for this work are as follows:—

Preliminary to taking vaccine material from vaccinated animals, said animals should be killed or otherwise rendered insensible to pain.

As soon as practicable after taking the vaccine virus, a necropsy shall be made upon each animal, and permanent records kept of each necropsy, in which particular reference shall be made of pathological changes.

All vaccine material from any animal having a communicable disease, other than vaccinia, or suspected of having a communicable disease, shall be destroyed.

The practice of renting animals for the purpose of propagating vaccine virus and returning the animals to the market shall be discontinued.

Animals used for propagating vaccine virus must be under daily veteri-

nary inspection for not less than seven days immediately before they are vaccinated. Only healthy animals free from communicable disease shall be used for this purpose.

The propagation and sale in interstate traffic of old-style dry "lymph" vaccine points shall be discontinued after January 1st, 1910.

Each and every lot of vaccine virus shall be examined to determine its freedom from pathogenic micro-organisms, and a special examination must be made of each and every lot to determine the absence of tetanus; detailed and permanent records of these examinations shall be kept by the establishment propagating said virus.

Containers, grinding and mixing machines, filling apparatus, instruments, etc., that come in contact with vaccine material during the process of manufacture and preparation for the market, shall be sterilized before use by steam under pressure at a temperature of at least 120° C. for not less than thirty minutes, or subjected to dry heat at a temperature of at least 160° C. for not less than one hour. Materials that will not stand this degree of dry heat shall be sterilized by a process known to be capable of destroying tetanus spores.

Refuse, wastes, excelsior, packing materials such as hay, straw, cotton, etc., crude materials and goods of miscellaneous origin and unknown history shall not be stored or permitted in or about vaccination stables or where the animals used for propagating vaccine virus are kept.

The regulations provide for unannounced inspection and examinations of the establishment at least once every year, and for an examination of the product purchased in the open market.

*   *   *   *   *   *   *   *

The diagrams appended do not require detailed description. The first shows the number of smallpox cases received at Quarantine Hospital from 1893 to 1909. The second represents the number of vaccinations made and points issued to physicians by the Health Department for fourteen years. Since 1905, the Department has not issued points to physicians. The small superposed columns represent smallpox cases. The third diagram shows the relative proportion among the smallpox cases of those vaccinated to those unvaccinated. It likewise shows the character of the scar. In the fourth chart are shown the years since vaccination until the attack of smallpox. We have included in this list all vaccinations whether resulting in a good, fair, or poor scar, or a "no take," excepting only those that were vaccinated after exposure to smallpox.

A study of these latter shows that unsuccessful attempts were made to vaccinate 56 exposed people who later developed smallpox. This is a very important fact and illustrates the danger of delaying vaccination until the outbreak of an epidemic.

The hurried and often imperfect work done at such times, added to the danger of having to use a point whose potency has been lost, justifies the present rules and requirements of the Board of Education.

IODINE IN SURGERY.

By Hugh A. Baldwin, M. D., of Columbus, Ohio,

Genito-Urinary Surgeon, Grant Hospital.

When years ago Lister, basing his practical work upon the results of Pasteur's experiment in putrefaction and fermentation, began the use of carbolic acid as a germicide, iodine was also tried, but for some reason the stamp of approval was given to carbolic acid, and iodine sank into innocuous desuetude. Recently, however, it has begun to come into its own, until to-day it stands head and shoulders above all other germicides; and carbolic acid, its old rival, is sinking back further and further until now it has but few uses. This rivalry between carbolic acid and iodine is so real that iodine is actually an antidote for carbolic-acid poisoning, both externally and internally; it neutralizes the corrosive action of the acid on the mouth and esophagus, overcomes the poisonous symptoms, and prevents lesions of the stomach and intestines by the formation, probably, of phenol iodide. This use of iodine was first described by Maberly,* although it had been previously suggested by Dannreuther.**

This article by Dannreuther is in many ways a most valuable contribution, and I suggest its careful perusal by anyone who may think that he has an original idea as to the use of iodine. Many things which he then foresaw have come to pass, and are now accepted as part of the daily routine in many hospitals.

Although it remained for Grossich† to give the necessary impetus to bring iodine before the profession as the ideal skin disinfectant, yet the following quotation from Dannreuther, published some nine months before Grossich reported his results, shows that the claim of originality must be denied Grossich: "Tincture of iodine is an excellent agent for disinfecting the skin before an incision for laparotomy, especially in the region of the umbilicus. One application with a camel's-hair brush is all that is necessary."

Even earlier than this, Cannaday†† had reported his formula for using iodine as a skin disinfectant. He was using at that time a .5 per cent. tincture of iodine, which is much weaker than that which is now in general use. He used this solution merely as a final application.

Iodine, as a skin disinfectant, has been in use in the various surgical services at Grant Hospital since the latter part of the year 1908, its use

*L'Union Pharmaceutique, November, 1908.
**Medical Record, January 25th, 1908.
†Zentralblatt fuer Chirurgie, October 31st, 1908.
††Journ. Amer. Med. Assoc., April 14th, 1906.

being begun shortly after Grossich gave assurance of its value. At first it was used with caution, and as an addition rather than a substitute, in our ordinary technique. We limited its use to the umbilicus and to the natural folds and creases of the abdomen, especially in fleshy patients. Shortly after this we began using it in emergency cases, and in them the entire operation field was painted. If Grossich left any room for doubt, our experience with these cases soon dispelled it. We noticed that these emergency cases always recovered without a sign of infection. It was but another step, soon taken, to begin the general use of iodine for all the cases.

It has now been used in more than two thousand sections, and has proved itself worthy of the trust placed in it by the various surgeons connected with the hospital. The method of application is practically the same for all the surgeons. In all cases, except emergencies, the field of operation is scrubbed, the day before the operation, with soap and water, shaved if necessary, alcohol and ether follow in order, and then a dry, sterile pad is applied, which remains in place until after the patient is anesthetized and on the operating table. The surface is then painted once over with tincture of iodine, U. S. P., taking care that it is not allowed to collect in puddles under the patient or in the inequalities of the surface. This coating is allowed to dry, and the sterile sheets and towels are placed in position, and the patient is ready for the operation.

In emergency cases the patients are anesthetized, placed on the table, the parts given a dry shave, scrubbed with ether, and painted once over with tincture of iodine. Grossich and others have shown that the iodine penetrates better through a dry skin; hence, if any preliminary scrubbing is to be done it must be done many hours previous to the operation, so that the superficial layers of skin will become thoroughly dry before the application of the iodine. That iodine acts better on a dry skin is undoubtedly true, but at the same time a wet skin does not contraindicate its use; it merely diminishes, to a slight extent, its power of penetration by causing the cells to swell.

An article by Bovee* gives the results of many bacteriological examinations made during the course of operations. The article should be read in full, but I may be allowed to set forth his conclusions here. Dilutions, as weak as 5 per cent. of the official tincture, thoroughly sterilize the skin surface after a period of from two to fifteen minutes. Pubic hairs placed in iodine dilutions of various strengths up to and including 40 per cent. of the official tincture showed growth after three days' incubation, while dilutions of 50 per cent., under the same conditions, practically always prevented growth. Control-scrapings of skin taken from the abdomen, when 40 per cent. dilutions were used, always showed negative results. Cultures from hair and skin that had been subjected to 50 per cent. dilution of tincture of iodine never produced growths. Dilu-

---

tions of less strength are unreliable if hair or large hair follicles are in the field of operation.

Many of the opponents of this method of sterilization seem to be afraid of the irritant action of the iodine, but a careful inquiry among the nurses at Grant Hospital, when we make the single application of the full strength tincture, fails to reveal a single case of irritation or other complication which might be attributed to the iodine. We found out early, however, that bichloride solution applied either before or after the iodine was likely to produce a dermatitis, but this was to be attributed not to the iodine but to the bichloride.

The use of iodine is not limited by any means to the skin of the abdomen, but it may be used in full strength or diluted on any part of the body.

Waterhouse* recommends a 2 per cent. tincture to be applied to the scrotum and penis in hernia operations when exposure is possible. In my own work, in operations upon the external genitals, I frequently apply the full strength tincture to the scrotum and the penis, taking the precaution to see, however, that it does not collect in the folds of the thighs.

We have no reason to believe that, as Propping** says, the use of iodine is conducive to the formation of post-operative adhesions, his theory being that the iodine is carried by ligature and sponge materials into the peritoneal cavity, there setting up an adhesive inflammation. On the contrary, we have frequently seen the 1 per cent. tincture mopped over the intestines when there was a possible contamination, and the edges of the abdominal incision in pus cases are frequently freely bathed in this solution in order to get primary union. Also, in experiments mentioned below, we prove that adhesions will not form around coils of iodine gut even when left for many days in the peritoneal cavity of guinea-pigs.

In cosmetic surgery of the skin, the use of iodine, except in very dilute strength, is inadvisable as the discoloration obliterates the surface markings to some extent, and it also makes the skin a little tough, which interferes with careful dissection and nice coaptation.

When Claudius, of Copenhagen, published his method of sterilizing catgut, we tried to make it after his directions, but it proved very unsatisfactory, as did also the various substitutes suggested by Senn, Bartlett and others. The method in use now gives us a catgut which seems to be perfect in every way, meeting all the requirements in regard to pliability, tensile strength, sterility, absorbability, simplicity of manufacture, etc. We have used this method for over three years, and in all that time there has not been a single case in which trouble could be ascribed to its use.

*Lancet, April 16th, 1910.
**Zentralblatt fuer Chirurgie, May 13th, 1911.

The preparation of this gut is simplicity itself. The raw gut is cut in five-foot lengths, wound into coils, and immersed in a solution with the following formula:—

> Iodine.....................................gr. lxxx
> Pot. Iod....................................gr. cxx
> Alcohol U. S. P............................oz. xvi

After three weeks it is ready for use, but it can be left in this solution for an indefinite time without deterioration. Every few days a new batch is started so that we can always be sure to have on hand a plentiful supply which has been immersed for three weeks or more.

Before the operation as much gut as will probably be needed is taken from the supply and transferred to a small dish containing alcohol. If any is left over after the operation, it can be replaced in the iodine solution.

This iodine catgut gave so much satisfaction after three years' experience, that I began to experiment with an iodine chromic gut. After trying various solutions, I finally decided upon the following as giving a chromacized gut that compared favorably with the commercial gut, was absolutely sterile, and very inexpensive. After the gut, prepared as in the iodine method, has been soaked in the iodine solution for three weeks, it is transferred to a solution made as follows:—

> Chromic Acid
> Carbolic Acid, āā......................gr. lxxvii
> Aq. Ster., q. s...............................oz. iv

After a period of from six to twelve hours, depending on the size of the gut and the resistance to absorption desired, it is taken from this solution and replaced in the iodine solution, where it is kept until used.

Before using this gut clinically, it was subjected to many laboratory tests for sterility. A priori it must be sterile, as we know the iodine catgut is sterile, and surely it could not be infected in the chromic acid solution. But to make assurance doubly sure, Dr. E. R. Shilling, Assistant City Bacteriologist, kindly tried the various cultural methods, but in every experiment he reported no growth. We next introduced the gut free into the peritoneal cavity of a number of guinea-pigs. Killing these pigs later it was found that there was no sign of infection, not even an adhesion around the gut. I think that there can be no question of the sterility of chromic catgut prepared in this manner, and surely its cheapness and ease of preparation will appeal to institutions using a large amount of animal suture material.

A suggestion, made to me recently by Dr. S. J. Goodman, was to saturate silk suture material with the same solution, as is used in the preparation of catgut, in infected cases where it seemed advisable to bring the skin together with silk. Although other portions of the wound

might suppurate, the antiseptic action of the iodine would be sufficient to prevent infection in the immediate neighborhood of the suture, and thus prevent it from cutting out. This suggestion would undoubtedly prove of practical value in circumcisions made in the presence of a chancroidal or balanic infection.

When one stops to consider that, as shown by Post and Nicoll* in an article on the "Comparative Efficiency of Some Common Germicides," iodine in a strength of 1/400 or .25 per cent. killed all germs in one minute, it is evident that we have no other germicide that can compare with this in efficiency, ease of application, and general utility. It can be used with impunity as an irrigating fluid for infected wounds, large abscess cavities, for vaginal or uterine douches, as a nasal douche or a gargle, or even in the bladder. Applied full strength or in a half dilution to a healing wound, it promotes healing and is even said to lessen scar formation. In the form of Grayson's solution,

$$
\begin{array}{ll}
\text{Iodine} \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots & \text{gr. vii} \\
\text{Pot Iod} \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots & \text{gr. xv} \\
\text{Glycerine} \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots & \text{oz. i}
\end{array}
$$

it can be applied with benefit to either tonsils or piles. Lewis** states that painting the stump of the umbilical cord, as soon as it is tied and wiped dry, prevents infection of the cord and hastens its separation and subsequent healing. At present I am trying a dilute solution as an injection or irrigation fluid in specific urethritis. As yet my results have not been satisfactory, but I hope eventually to find a solution which will be unirritating to the mucous membrane and yet of sufficient strength and penetrating power to destroy the gonococci.

In a rather large experience with cases of erysipelas, in a Pennsylvania State Hospital, I have tried all the many medicaments suggested by various authors, and carefully watched and compared the results. It may be merely a coincidence, but I found that I got the best results in those cases in which I used iodine.

Each day, more and more uses for iodine will be brought to light, and I believe that the time is not far distant when iodoform with its chancroid-suggesting odor, carbolic acid with its "hospitally" smell, and the all corroding corrosive sublimate, that broken reed of antiseptics, will be almost entirely replaced by iodine.

347 East State St.

HORMONAL IN INTESTINAL STASIS.

By George Howard Hoxie, A. M., M. D., of Kansas City, Mo.

Hormonal (Zuelzer) is an extract of spleen supposed to contain a hormone that stimulates intestinal peristalsis. Its promoters say that in appropriate doses it should re-establish a normal peristaltic rhythm even after several years of constipation and intestinal stasis. It is administered intravenously and intramuscularly. For intravenous administration it is put up pure; for intramuscular use there is added 0.25 per cent. of eucaine hydrochloride. The dose in either case is 20 c.cm. (The vials, however, seem short in measure, and I usually was able to inject only 16 to 18 c.cm.)

I have used it in the following cases:—

Case I.—J. P. S., male, æt. fifty, grain elevator operator, complains of inability to get around because of "weakness in hips and knees."

Eighteen years ago, in consequence of the pulling of a tooth under anesthesia, patient was "paralyzed" in his right leg for several days. Since then his troubles have been accumulating, but with occasional remissions.

Constipation present. Occasional pollakiuria. Unable to amuse himself with reading on account of bad eyesight. Speech slightly affected.

Patellar reflexes exaggerated. Kernig and Babinski positive in right leg. Eyes sluggish. Blood-pressure 185 to 215 (Tycos) on different days.

Patient was admitted to the Bell Hospital, and the contents of a vial of hormonal (16-20 c.cm.) was injected into the left median vein. The patient was kept in the hospital three weeks longer, but no appreciable effect on the bowel function could be seen.

Case II.—B. F., æt. forty-five, night watchman, had a bad case of icterus in September, 1910, and was never "right" after it. Entered hospital six months later, emaciated, weak, no appetite, constipated. The only positive physical finding was that of an enlarged colon. General treatment seemed without result: and, finally after a stay of three weeks in the hospital, an intravenous injection of 16-20 c.cm. of hormonal in the left median vein was given. The bowels began to act regularly in two days, and in ten days the patient was discharged from the hospital increased in weight and feeling better in every way.

He was seen again on October 13th, 1911. His bowels were still regular, but he was suffering from headache, backache, no appetite, etc. Pulse 88; temperature 38.8° C. At this time his blood showed Hb. 100,

coagulability normal, reds 4,000,000, whites 4,600, polys. 73, large lymphs 3, small lymphs 19, monos. 5. Many immature cell-forms with a heavy staining of the ripe cells. Under general treatment plus 20 minims of a 10 per cent. solution arsacetin injected deep in the interscapular region, the patient was able to go back to work on October 19th.

Case III.—S. W., æt. twenty-seven, female, married. Constipated for five years, since an abortion. No further pregnancies. Pulse 84. Weight 135 lb.; sleep good, appetite good. Not nervous. Leucorrhea of distressing proportions. Stomach dilated. On May 23rd, 1911, 16 c.cm. hormonal was injected into the left median vein. On the 27th she said that she saw very little effect, but later reported that the bowels were practically normal for two months. On November 14th, 1911, she was in the same condition as before the injection—feels tired and "bad" all the time. Appetite good, sleep good, menses regular but painful, heavy malodorous discharge from cervix. Headache becoming more frequent. Backache after exertion. Blood: Hb. 100, whites 7,200, polys. 74, lymphs 21 (large 10, small 11), monos. 4, nuclei of polys. hard to stain, granules dark.

Case IV.—Mrs. K., æt. forty-three. Operated on twice, once for gallbladder, once for ovarian trouble. Constipated all her life. Troubled by nervousness, cardiac palpitation, swelling of feet, headaches, pain in right iliac fossa. Blood-pressure 100-110. Colon dilated ("holds a gallon," according to patient).

The contents of a vial of hormonal was injected intramuscularly May 26th, 1911. The injection caused the patient great pain, and she was prostrated for several days. No particular effect on the intestinal peristalsis was obtained, and her bowels were kept open with vaseline and her diet carefully regulated. Under this regimen she was very much better. On October 21st, 1911, her blood showed the following picture: Hb. 70-80, rapid coagulability, whites 5,600, polys. 58 (largely myelocytes), eosinophiles 2, lymphocytes 25 (large 13, small 12), monos. 13. In general, the nuclei were swollen and indistinct. She suffered from occasional headaches, and found it necessary to watch her diet and continue with the vaseline.

Case V.—T. W., male, æt. forty-two, contractor. Complains of constipation, loss of sexual power, poor memory, had hearing, despondency. Skin dusky. Blood-pressure 90, weight 177½ lb. (usually 185), height 5 ft. 8 in. Has abdominal roll (enteroptosis) in hypogastrium. Indicanuria. Blood: Hb. 100, reds 3,872,000, whites 5,400. polys. 54½, eosinophiles 3½, large lymphocytes 19, small 11, mast cells 1. Granules heavy. On November 1st, 1911, 9 c.cm. of hormonal was injected into each infrascapular region. The bowels were opened with Robbin's cascara pills. The injection caused little or no discomfort. The temperature that evening was not above 99° F. There was little or no improvement following this treatment, but under the administration of

arsacetin with the needle and of potassium iodide per os, the skin is gradually clearing and the patient is becoming more lively.

In addition to the above experience, I have received letters from three physicians in New York City, who have been using hormonal and whose conclusion is that in many cases of post-operative peristaltic paralysis, hormonal seems able to re-establish the normal rhythm. They, however, are not yet ready to publish their case histories.

While realizing the fact that these few cases are not sufficient to establish general conclusions, nevertheless by classifying constipation in the following groups, we may make our inquiry into the value of hormonal more definite, and outline a basis for further reports:—

A.	Spastic	1.	Anal reflex.
		2.	General "nervousness."
		3.	Reflex from stomach and duodenum.
B.	Flaccid	1.	General nervous relaxation.
		2.	Paralysis of spinal centres.
		3.	Paralysis of sympathetic centres.
		4.	Muscular atony.
C.	Obstructive	1.	Lane's kink, enteroptosis, etc.
		2.	Pressure from tumors, etc.
		3.	Hardened fecal masses.

According to this classification we have evidence as to the effect of hormonal in the following types:—

> A. 2. (Case IV.)
> B. 1. (Cases III. and V.)
> B. 2. (Case I.)
> B. 3. (Surgical reports.)
> B. 4. (Case II.)

In spite of Zuelzer's statement that hormonal was effective even in spastic constipation, I must say that I should not expect it to be so. My experience with Case IV. tends to confirm this opinion.

In that form of flaccid constipation in which the cerebrospinal centres are affected, hormonal seems useless (Case I.); but, on the other hand, it seems to have some effect in flaccidity due to inhibition of the sympathetic centres (post-operative paresis), and in constipation due to a general peripheral atony (Case II.).

It is worthy of note that the two intramuscular injections both failed, while of the three intravenous injections two were effective.

302 Argyle Building.

A NEW REFLEX PHENOMENON IN THE HAND: THE WRIST-SIGN.*

By CHARLES GILBERT CHADDOCK, M. D., of St. Louis,
Professor of Diseases of the Nervous System, St. Louis University; Visiting Neurologist, St. Louis City Hospital.

For some time I have been studying what seems to me to be a new reflex movement of the hand. I have now observed it in a sufficient num-

Fig. 1.

ber and variety of cases to justify me in presenting a description of it for your consideration. Since I am unable to give an actual demonstration of it here, I must supplement my description by photographs taken of the hand in two cases in which the phenomenon was excitable, readily and perfectly. Should the matter prove of interest to you, I shall be glad to demonstrate it to any of you at the St. Louis City Hospital any morning at your convenience.

Reasoning by analogy, it seemed to me that since there is a peculiarly sensitive area of skin on the outer side of the ankle, irritation of which

---

*Read before the St. Louis Neurological Society, January 8th, 1912.

induces an important abnormal reflex phenomenon (the external malleolar sign),* there should or might be some skin-area about the wrist, irritation of which would induce an analogous movement in the fingers and hand. An area on the wrist which seemed to me to correspond anatomically with the external malleolar skin-area, I thought a promising field for investigation. The place I chose is located on the palmar surface of the wrist at the junction of the palm with the wrist, and just at the ulnar side of the tendon of the *flexor carpi radialis* and the tendon of the *palmaris longus*, evident as a groove or depression when the hand and fingers are in moderate flexion. My experiments have seemed to show that from the skin of this groove, as far distally as the base of the

Fig. 2.

thenar eminence in the palm, and proximally an inch or so up the bend of the wrist, a peculiar reflex movement can be excited in case of disease of the corresponding pyramidal tract at a level higher than related spinal centres in the cervical enlargement of the cord. Indeed, in a few instances, irritation of almost any area of the skin of the forearm, as high as the elbow on the ulnar side, has induced the movement I shall describe.

The form of irritation I have used is scratching with a dull-pointed

*A Preliminary Communication Concerning a New Diagnostic Nervous Sign (*Interstate Medical Journal*, July, 1911); the External Malleolar Sign, etc. (*Interstate Medical Journal*, October, 1911); An Explanation of the External Malleolar Sign, etc. (*Journ. Mo. State. Med. Assoc.*, October, 1911).

orangewood stick, or with a dull-pointed nail-file as shown in the photographs. In a few cases, pressure with the point of the instrument, without scratching, has proved effective.

The movement I have observed consists of flexion of the wrist and simultaneous extension and separation of all the digits. In certain cases this movement occurs slowly, and the resulting attitude is maintained for a few moments while the stimulus is continued; in other cases, it occurs very quickly and sharply, even occasionally with observable nervous tremor. In addition to this movement there is frequently, if not invariably, a simultaneous contraction of the triceps muscle, limited to a few of its middle fibres as a rule, but in some cases amounting to a decided bulging of the whole muscle. It will be noted that there is here a certain

Fig. 3.

correspondence with the movement of thigh-muscles excitable from the sole and external malleolar skin-area; and also that the induction of this movement, in some cases, from a wide area of the skin of the forearm, is analogous to abnormal toe-signs excitable from extensive skin-areas of the lower extremities.

Concerning the mechanism of this movement, I can at present give only the results of incomplete observations. Thus far it seems to be due to active reflex contraction of the flexors of the wrist (with excitation of the triceps), while the separation and extension of the digits is apparently often a passive mechanical result. However, in some cases there has been evidence of some active contraction of the extensors of the digits, shown most clearly in wide separation of them, especially of thumb and little finger. There is in this movement no action of the *interossei* or

lumbricales. Future experiments will perhaps decide in how far active contraction of the extensors may be concerned in the phenomenon.

Figs. 1 and 2 are from photographs of the right hand in a case of bilateral sclerosis of the pyramidal tract in a man about sixty years of age. The patient is demented; presents almost complete spastic paraplegia, with lower extremities fixed in extension; arms and hands freely movable and remarkably powerful; deep reflexes all exaggerated with typical abnormal reflex signs in lower extremities. All abnormalities are symmetrical and equally developed; there are no atrophies. Fig. 1 shows an unsuccessful attempt to induce the finger phenomenon* described by Gordon, of Philadelphia. Fig. 2 shows the phenomenon I describe. The flexion of the wrist is evident in that the tips of the fingers are visible, but it is more marked than the photograph reveals clearly. The movement occurs in this case slowly.

Fig. 4.

Figs. 3 and 4 are from photographs of the right hand of a colored boy aged fourteen, presenting a typical condition of right congenital cerebral hemiplegia, who is imbecile and epileptic. The state of contracture can be overcome by rather powerful passive effort, but the habitual position is immediately resumed. Fig. 3 shows the hand in its usual position; Fig. 4 shows the separation of the digits clearly, when the nail-file point was pressed on the area already described; and there was increase of flexion at the wrist. The movement in this case occurs sharply, with tremor of the fingers (extensor activity). The phenomenon could be elicited on both sides.

Journ. Amer. Med. Assoc., Vol. LVII, No. 20, p. 1591.

It will be understood that I have thus far failed to find this phenomenon in normal persons, though I have looked for it for several months in numerous cases. I have observed it in many cases in which there was evidence of disease of the motor tract or tracts: in dementia paralytica, organic epilepsy, organic hemiplegia, multiple sclerosis, tuberculous meningitis of the cord, cerebrospinal lues, chorea of Sydenham, and cerebral trauma (skull fracture with intracranial hemorrhage).

The strongest presumption of the pathological significance of this phenomenon seems to me to be afforded by its comportment in cases of cranial trauma. In the case of W. H., adult, whose skull was fractured by blows of a wrench, and who lay unconscious after craniotomy and removal of intracranial blood-clots, for two weeks, this phenomenon was present on both sides before and after operation, and associated with double Babinski. After a few days (patient still unconscious and delirious) the left wrist phenomenon disappeared and the left plantar became normal. For a long time the right wrist and Babinski phenomenon persisted; but these disappeared; patient has been discharged.

In conclusion I wish to add that I have not yet been able to establish any relation between this sign and the finger-phenomenon of Gordon; indeed, Gordon's manipulation prevents the occurrence of an essential element of the wrist-sign (flexion); furthermore the latter occcurs in response to superficial irritation, and has no relation seemingly with the normal hypothenar or pisiform reflex which is induced by pressure on and displacement of the pisiform bone.

I would call this phenomenon "the wrist-sign," if study of it by you confirm my presumption of its clinical and pathological signficance.

3705 Delmar Boulevard.

TRANSDUODENAL CHOLEDOCHOTOMY.

By Joseph Henry Fobes, M. D., of New York.

A study of common-duct cholelithiasis presents many interesting points.
The ductus communis choledochus is a tube about three inches long
by one-quarter of an inch in diameter, extending from its junction with
the cystic and hepatic ducts to the ampulla of Vater. It may be divided
into three portions: First, or supraduodenal, lodged in the free edge of
the gastrohepatic omentum with vena cava behind and hepatic artery to
the left; second, or retroduodenal, behind the duodenum, in the majority
of cases running through the pancreas; third, or transduodenal, about
three quarters of an inch long, lying posteriorly with the duct of Wir-
sung in the coats of the descending portion of the duodenum. It is with
the last named portion that this paper is concerned.

In the year 1884, Langenbuch first suggested the operation of trans-
duodenal choledochotomy. McBurney performed the first operation along
these lines in 1891, incising the anterior wall of the duodenum, then widen-
ing the ampulla by incision until the stone is delivered. Collins modified
the operation by seizing the lips of the ampulla, so widening it as to
admit a toothed forceps, grasping and delivering the stone. Kocher,
later in 1894, performed transduodenal choledochoduodenostomy interna
for impacted stone high in the transduodenal and retroduodenal portions.
Mayo-Robson first operated in 1898, and in 1903 had performed 15
operations with a mortality of 3, the last 9 cases having a perfect recovery.
Moynihan is in favor of this operation for transduodenal cholelithiasis.
Thienhaus reports (*Annals of Surgery*, 1902) 29 operations with 2
deaths. Connell reports 77 cases with 10 deaths. Mayo reports 4 cases
of this character in 2,000 cholelithiasis cases.

I take pleasure in reporting the following case:—Mrs. K., referred by
Dr. G. F. Laidlaw; æt. thirty-six, married, native of United States, white,
presented a clear case of obstructive cholangitis of several years' dura-
tion. Last acute sickness started several months ago and still continues.

On July 15th, 1911, the abdomen was opened in the Mayo-Robson
line. The gall-bladder presented moderately full, no stones in trans-
duodenal portion. The descending portion of the duodenum was brought
into full view, and, with the abdomen well protected by salt packs, was
incised for about one inch along its anterior surface. The gut was prac-
tically empty. The index finger, through the foramen of Winslow, and
the thumb above held the stone firmly while the posterior wall of the duo-
denum was stretched tightly on it. This was incised for about one-half

inch upward from the ampulla, and the stone popped through. The flow of bile, highly infectious, was carefully mopped away, and the posterior walls of the duodenum and bile-duct closed partially by one interrupted stitch of No. 1 iodine gut. The anterior wall of the duodenum was then closed by the usual two-layer-internal-through-and-through iodine gut No. 1 and the external Cushing-Lembert-Pagenstecher No. 1, and the gut allowed to drop back. A dressed tube was placed in the gall-bladder according to the usual method, and the abdominal wound closed. After the second day when it became necessary to employ a favorite treatment —gastric lavage with potassium permanganate, leaving one-half pint in the stomach—for dilated stomach, the patient pursued an uninterrupted recovery. The tube was removed on the ninth day. She was out of bed before her two weeks were up, and now reports a gain of 12 lb., notwithstanding nervous phenomena attending a cessation of her menstrual periods.

CONCLUSIONS.

The other methods by which an impacted stone in the transduodenal portion of the common duct may be treated are: (1) grasping stone by large rubber-covered forceps and crushing, which is dangerous for the duodenum, bile and pancreatic ducts and pancreas; (2) passing needles into stone and breaking into finer particles, which is difficult in an old concretion, unsurgical and dangerous because the eye cannot follow the needle; (3) passing probe from above through common duct forcing stone into duodenum, which is dangerous to pancreatic duct, bile-duct and duodenum because of tearing structures instead of cleanly incising them; (4) by extensive dissection and mobilization either from below along the external edge of the ascending colon or by mobilizing the duodenum extensively, a dangerous procedure involving injury to the pancreas which must be cut by the thermo-cautery often leaving pancreatic fistula.

To cut the Gordian knot from the front is easier and better than trying to untie it from the rear; therefore, transduodenal choledochotomy is the operation of choice in impacted stone in the transduodenal portion of the common duct.

1 West 68th Street.

HEMORRHAGIC INFARCT OF THE SMALL INTESTINE.

By L. H. HEMPELMANN, M. D., of St. Louis.

The subject of hemorrhagic infarct of the intestine usually receives but scant attention in medical textbooks, as the cases are rather rare and the diagnosis difficult, and in many instances impossible. The following case, which came under observation some time ago, has caused the writer to look up the subject and is responsible for this brief paper.

Patient, æt. forty-seven, chemist by occupation, was first seen by the writer on April 3rd, 1909, on the ninth day of his illness. Father died of an aneurysm of the popliteal artery; mother living. The whole family, including the patient, is distinctly neurotic. Had always enjoyed good health although he stated that he had been nervous for several months, had worried a good deal about his business affairs and had been unable to sleep well for some time. He smoked moderately, was a very heavy eater and drank liberally in the good old German fashion. Venereal disease was denied.

When seen on April 3rd (ninth day of his disease), he was throwing himself about on the bed groaning incessantly and seemed in very great pain. After a little talk he calmed down enough to give a very intelligent history of his trouble. He stated that he had been seized with colicky pains about the umbilicus on March 25th, which compelled him to stop work. He took some laudanum which relieved him so greatly that he was able to attend to his business on the three following days, although he was never entirely free from pain. On the fourth day of his illness, the pain having persisted, he sent for his physician who gave him some calomel which produced a copious evacuation. The pain, however, was not relieved; there was a constant dull pain in the abdomen with frequent colicky exacerbations. It grew gradually more severe and became so unbearable on the evening of the 31st (sixth day) that he sent for his physician during the night. The latter, however, seems to have had the impression that he was dealing with a case of hysteria and refused to respond to the call. A neighboring physician, who was called in, found him writhing in agony and administered morphine hypodermically, giving first ¼ grain, then in a short time ½ grain, and an hour later, the patient not being relieved, he gave a grain at one dose (1¾ grains in about an hour and a half). Strangely enough, this physician too seems to have thought that he was dealing with a neurosis. Following this, the patient was in a stupor for fourteen hours with pin-point pupils and respirations as low as seven per minute. The pain returned

as soon as the stupor wore off. He vomited once and had a fairly good bowel movement after an enema. The temperature had been normal until this time, and the pulse varied from 80 to 90.

The writer saw patient first on the ninth day of his illness (April 3rd) ; at this time he complained of constant abdominal pain with colicky exacerbations, which had its point of maximum intensity a little below and to the left of the umbilicus. The facial expression was good, not at all pinched, and the eyes were alert and bright. The examination of the thoracic organs showed a slightly accentuated second aortic sound ; otherwise the examination was negative. The abdomen was not distended and not especially sore to the touch, except at a point a little to the left of the navel where there was also some slight muscular rigidity. Percussion was negative, the liver dullness being approximately normal. The oral temperature was normal, rectal 102° F. Pulse 112. Rectal examination was negative and examination of the urine showed specific gravity 1,022, 1/10 per cent. albumin, no sugar, a very great increase in indican, and hyaline and granular casts. The nurse stated that an enema given earlier in the day had brought a little fecal matter mixed with some dark red blood. Moderate doses of morphine and atropine were ordered, which gave him but slight relief, although he slept several hours. He also vomited several times during the night.

The following morning found his suffering the same as on the evening previous, the abdomen was still soft, but rather more sensitive to the left of the navel. The pains, however, had more of an obstructive character, and were often accompanied by gurgling noises although there was never any stiffening of the bowel. The pain increased in intensity and the colickly attacks became so much more frequent throughout the day that toward evening he was removed to the hospital and prepared for operation. His temperature was 101.6° F., pulse 95 and respiration 20. There had been no passing of gas that day, and the rectum was found to contain a little black semi-solid fecal matter.

Dr. Nietert opened the abdomen in the median line on the evening of the tenth day of his illness (April 4th). There was no peritonitis, although the peritoneal cavity contained some free bloody fluid. After some search an infarcted piece of small intestine was found in the left upper quadrant near the spleen. It was about eight inches in length, black in color, and quite solid to the touch. The mesentery which supplied this part was swollen and appeared edematous. Thirty-one inches of intestine, including the infarcted portion, was resected, beginning at a point about twelve inches below the ligament of Treitz, after which an end-to-end anastomosis was made by means of the Murphy button. He was returned to bed with a pulse of 160, and the usual restoratives applied.

The following morning his temperature was 101.8° F., pulse 100, respiration 26. He had vomited copiously and complained of a good deal

of pain. Repeated attempts to pass the stomach-tube failed, the patient pulling the tube out at each attempt. That evening at eight o'clock his temperature was 100.2° F., pulse 140, and respiration 28; he was suffering intensely, but seemed quite clear mentally. At 9:15 p. m., a half hour after the writer's visit, he sprang from his bed while the nurse's back was turned and jumped from the third-story window, sustaining injuries from which he died a half hour later. Permission to hold an autopsy could not be obtained, but the wound was reopened, and the anastomosis and the peritoneum found in good condition.

Examination of the resected bowel showed the walls of the infarcted part thickened to measure three-quarters of an inch in diameter; the gut was quite rigid, the lumen diminished and containing a bloody, grumous material; in places, the mucous membrane was necrotic, and the mesentery was thickened and edematous. Both the arteries and the veins were so plugged that it was impossible to determine whether there was an arterial or a venous thrombosis.

Thrombosis of the superior mesenteric artery was described by Virchow in 1847; it received but little notice until Litten called attention to it again in 1875. In 1904 the exhaustive article of Porter, Jackson and Quimby appeared in the *Journal of the American Medical Association,* since which time there has been no material addition to the literature.

The superior mesenteric artery and vein supply the smaller intestine below the duodenum. Emboli lodging in a larger or smaller branch of the vessel, or thrombi forming in the lumen, will lead to hemorrhagic infarct of the bowel, as will also an embolus or thrombus formation in the superior mesenteric vein. The superior mesenteric vessels are not terminal arteries, but the anastomoses are not extensive enough to nourish the vessel; they do, however, carry so much blood to the part that the occluded area is made turgescent, and soon diapedesis takes place. Then the gut-wall and the mesentery become black-red and thickened by the mass of blood. Necrotic ulcers form on the mucous membrane, and after a time the entire occluded area becomes gangrenous, as a rule.

In the literature are described several cases of complete obstruction of the superior mesenteric artery without infarction, a collateral circulation sufficient for nutrition having developed via the pancreatico-duodenal and the inferior mesenteric artery. Two cases of ligature of the artery are also on record, the patients having recovered.

Etiology.—Anything that may cause an embolus of any other part of the body can also cause embolism of the mesenteric artery; endocarditis, atheroma and arteriosclerosis being the most frequent causes. It is seen occasionally in the latter stages of heart disease. Venous thrombosis is liable to ensue as the result of stasis in the portal system; it has also followed suppurative processes about the appendix; and in two cases has followed operation (gastro-enterostomy and goitre).

Course of the Disease.—An acute and a chronic course have been

described, the former being very much the more frequent. In the acute cases the onset is sudden; great pain, vomiting, often of bloody material, and great prostration following each other in rapid succession. There is usually also bloody stool, although the obstructive symptoms may develop so rapidly that there is no chance for the bowel to expel its bloody contents. Peritonitis and death usually end the suffering in a few hours or days.

In the cases taking the chronic course, the onset is insidious, and the symptoms often remittent and more or less chronic in character. It has been supposed that the acute cases were the result of arterial obstruction, while the chronic ones were the result of venous thrombosis. Porter, Jackson and Quimby, however, find as a result of their analysis of 121 cases that the venous cases are quite as likely to take an acute course as are the arterial ones.

Age and Sex.—Two-thirds of the cases occur in men and one-third in women, as one would naturally suppose from the greater frequency of arteriosclerosis in males.

Pathology.—The infarcted bowel is usually found to be dark red in color, firm to the touch, and the intestinal walls a half inch or more in thickness. The mucous membrane is usually necrotic in places, and the lumen of the intestine is very much diminished and filled with dark bloody contents. The mesentery is edematous and swollen, and the vessels are plugged by a clot. If the patient has lived long enough, the bowel will be found gangrenous, perhaps with a more or less well-defined line of demarcation. The peritoneal cavity usually contains free bloody fluid, and there may be also a peritonitis.

Symptoms.—Pain is the most constant clinical manifestation of mesenteric thrombosis, its absence being noted in only 7 per cent. of the cases analyzed by Porter, Jackson and Quimby. The onset is usually sudden; and the pain is constant as a rule, with frequent colicky exacerbations, and while there is usually a diffuse soreness present all over the abdomen, its point of maximum intensity is often a little to the left of the umbilicus. Nausea and vomiting make their appearance rather early and are quite persistent; often the vomitus is bloody in character.

The stools contain blood in about half the cases; with the onset of obstructive symptoms there is a stoppage of stool and flatus.

There is usually very little sensitiveness to palpation and surprisingly little rigidity; the intense subjective pain, with but little sensitiveness to palpation and almost entire absence of rigidity, forming one of the striking features of the disease.

Abdominal distention is usually a late symptom; once established, it is progressive as a rule.

The urine contains large amounts of indican, and in a few cases the presence of glucose has been noted. The latter has also appeared in the urine after experimental ligation of the superior mesenteric artery in dogs, as reported by Tangier and Hartley, and by Kelisch.

Prognosis.—The prognosis is extremely grave, although the chronic cases are slightly more favorable. Hemorrhagic infarct has been known to heal spontaneously through the establishment of a collateral circulation, but no one would think of employing the expectant plan of treatment in this day of abdominal operations, although the mortality in a series of 47 cases that came to operation was 92 per cent. Elliott resected forty-eight inches of intestine in one case, with recovery of the patient after a rather stormy post-operative period, and has had another successful case since. Strange enough, of the nine successful operative cases reported in the literature, three (two by Elliott and one by Codman) were operated upon at the Massachusetts General Hospital.

Diagnosis.—While the diagnosis of mesenteric thrombosis is always difficult and in many cases impossible, the following points are rather suggestive:—

1. Sudden abdominal pain occurring in a patient beyond the third decade, the pain being either very violent from the very beginning or becoming progressively worse for several days.

2. The intense suffering of the patient often associated with writhing on the bed, and nervous symptoms remotely suggesting hysteria combined with lack of rigidity and distention, and a comparatively normal pulse and temperature.

3. Bloody vomiting and stools.

4. Demonstration of a source from which an embolus may have been derived, viz., endocarditis, phlebitis, etc.

Treatment.—The treatment, of course, is surgical; in many cases it may be wiser to bring the ends of the bowel out of the wound and make an artificial anus rather than to attempt an immediate anastomosis.

MEDICAL AND SURGICAL PROGRESS.

THE DIAGNOSTIC AND THERAPEUTIC USE OF TUBERCULIN.

A REVIEW OF RECENT LITERATURE.

By Albert E. Taussig, M. D., of the Editorial Staff.

1. Bachrach and Necker: Urogenital Tuberculosis. (*Wien. klin. Wochenschr.*, No. 39, 1911.)
2. Barabaschi: Special Tuberculin Reaction. (*Gaz. d. Osped.* XXXII, No. 75.)
3. Benker: Tuberculin Reactions. (*Interstate Med. Journ.*, December, 1911.)
4. Bluemel: Choice of Tuberculins. (*Muench. med. Wochenschr.*, No. 34, 1911.)
5. Brown: Tuberculin Tests. (*Amer. Journ. Med. Sciences*, October, 1911.)
6. Camphausen: Endotin. (*Beitr. z. Klin. d. Tub.*, XX, No. 2.)
7. Engel: Intracutaneous Reactions. (*Deutsch. med. Wochenschr.*, No. 36, 1911.)
8. Freymuth: Albumose-Free Tuberculin. (*Beitr. z. Klin. d. Tub.*, XX, No. 2.)
9. Jochmann and Mœllers: Koch's Albumose-Free Tuberculin. (*Deutsch. med. Wochenschr.*, No. 28, 1911.)
10. Krusins: Tuberculin Reactions in the Eye. (*Deutsch. med. Wochenschr.*, No. 46, 1911.)
11. Meyer: Tuberculin Treatment in General Practice. (*Therapeut. Monatsschr.*, No. 8, 1911.)
12. Mœllers and Heinemann: Tuberculin by Mouth. (*Deutsch. med. Wochenschr.*, No. 40, 1911.)
13. Packard: Tuberculin in Joint Tuberculosis. (*Amer. Journ. Orthop. Surg.*, August, 1911.)
14. Pia: Diagnostic Reactions with Tuberculin. (*Presse Méd.*, No. 85, 1911.)
15. Pottenger: Difficulties in Therapeutic Use of Tuberculin. (*Journ. Amer. Med. Assoc.*, LVII, No. 12.)
16. Radziejewski: Cutaneous Tuberculin Reactions. (*Zeitschr. fuer Kinderheilk.*, II, No. 6.)
17. Ritter: Tuberculin in Ambulatory Pulmonary Tuberculosis. (*Journ. Amer. Med. Assoc.*, LVII, No. 2.)
18. Rœmer: Tuberculin in Infants and Young Children. (*Archiv fuer Kinderheilk.*, LVI, Nos. 1-3.)
19. Saathoff: Specific Recognition and Treatment of Tuberculosis. (*Muench. med. Wochenschr.*, No. 48, 1911.)

20. Shepard: Intravenous Injection of Tuberculin. (*Journ. Amer. Med. Assoc.*, LVII, No. 12.)

21. Stern: Tuberculin in Orthopedic Diagnosis. (*Amer. Journ. Orthop. Surg.*, August, 1911.)

22. Vallow: Tuberculin in Diagnosis and Treatment of Pulmonary Tuberculosis. (*Practitioner*, November, 1911.)

23. Waugh: Tuberculin in So-Called Tuberculous Glands. (*Quart. Journ. Med.*, July, 1911.)

24. Wilkinson: Tuberculin Dispensaries. (*Brit. Med. Journ.*, August 26th, 1911.)

25. Wilms: Tuberculin in Surgical Tuberculosis. (*Deutsch. med. Wochenschr.*, No. 36, 1911.)

26. Wolff-Eisner: Tuberculin Therapy. (*Berl. klin. Wochenschr.*, No. 28, 1911.)

Tuberculin, formerly confined, at least in its therapeutic application, to well-equipped sanatoria, is coming more and more to be used by the general practitioner. The brilliant results obtained by graduated injections have made him feel that he too should avail himself of a procedure that he has seen vaunted as almost a specific in all forms of tuberculosis. It seems, therefore, proper from time to time to summarize critically the recent literature on this subject, pointing out not only the favorable results obtained, but also the dangers and disappointments incident to the use of this double-edged sword.

Theory of Its Action.

While much in our theories of the action of tuberculin is as yet purely speculative, and while we are entirely ignorant of the details of its action, there is a good reason to believe that it is essentially an anaphylactic process. When any proteid is injected into the body, the cells of the latter acquire the ability to break up this proteid. A second injection of this proteid will therefore lead to the destruction of the latter; and, since the products of its disintegration are usually poisonous, there will result, if sufficient was injected, the typical symptom-complex of anaphylactic intoxication. While thus this process is essentially an endeavor on the part of the body to protect itself against a foreign proteid, this protective effort may result in a self-inflicted injury. In tuberculosis, a similar process apparently takes places. The tubercle bacilli with which the patient has been infected, usually in childhood, are in part broken up, for one reason or another, their proteid substances are absorbed and, in some manner, endow the infected organism with the power of destroying tubercle-bacilli proteid. In individuals in whom this power is adequately developed, the tuberculous process is aborted and never becomes clinically manifest. This is the case with the great bulk of the people of civilized nations. In certain individuals, however, this anaphylactic power does not result to a sufficient degree; these are the ones that become clinically tuberculous. Whether this is the whole story or not, whether the brilliant results obtained in consumption by proper hygiene alone are due to a stimulation by the latter of the anaphylactic process or to something else we do not know. At any rate, this theory offers the best available explanation of the action of tuberculin both diagnostically and therapeutically.

The activity of tuberculin may be assumed to depend upon the tubercle-

bacilli proteid contained in it. When it is injected into a patient, who has never had tuberculosis, nothing happens. The organism cannot break it up, and it is excreted unchanged, or nearly so, like any other foreign substance. The tuberculous individual, whether actively so or not, has acquired the power of disintegrating this proteid. When tuberculin is injected into him, its proteid is broken up and two phenomena result. If the amount injected is sufficient, the resulting poisonous decomposition products produce an intoxication, which according to circumstances may be local, confined to the site of inoculation or to the neighborhood of the tuberculous focus, or generally resulting in fever and more or less malaise. The other result is that these toxic products, circulating in the blood, increase, in proper dosage, the ability of the tissues to destroy tubercle-bacilli proteid, and so enable them better to cope with the infection. The aim of the diagnostic use of tuberculin is to produce enough intoxication, local or general as the case may be, to reveal the presence of the tuberculous infection, but not so much as to injure the organism. The aim of the therapeutic use of tuberculin is to produce the maximum stimulation of the anaphylactic power of the tissues with the minimum intoxication.

This theory of the action of tuberculin is far from covering the whole ground. The process is obviously far more complicated. This is shown, for instance, by the fact that successive injections may result in complete tuberculin immunity while the tuberculosis progresses steadily; and by the experience that a hypersensitiveness to tuberculin, which often results from repeated injections of very small doses, does not seem to produce a favorable influence upon the disease. At present, however, the theory explains the known facts better than any other, and at least may serve as a peg whereon to hang our clinical observations.

CHOICE OF TUBERCULIN.

A great variety of tuberculins have been placed on the market, each of which is represented by its advocates as having some theoretic superiority over all others. The number of such preparations at the disposal of the practitioner is so great that he may well feel some difficulty in making a choice. In general these tuberculins may be divided into three groups:—

1. Those that contain chiefly the products of metabolism of the tubercle bacillus.
2. Those that contain its body substance (endotoxins).
3. Those that contain both.

The tuberculins usually included in the first group are:—

Tuberculinum Kochii usually called "Old Tuberculin." In its preparation a glycerine-bouillon culture of tubercle bacilli is boiled and then is concentrated at 70° C. to one-tenth its original volume and then passed through a porcelain filter. It was formerly thought to contain only the products of tubercle-bacilli metabolism, since the bacilli do not pass through the porcelain filter. Wolff-Eisner has, however, shown that old tuberculin contains, besides the soluble toxins, many splinters of the bacilli so small that they pass through the filter. It is thus made up of endotoxins as well as of soluble toxins, and should strictly speaking be placed in the third rather than in the first group.

Endotin, known also as "Tuberculinum Purum," is old tuberculin treated with alcohol, xylol, ether and chloroform, decanted, centrifugated, and finally treated with hot dilute lye. Through this procedure, the

tuberculin is said to be freed from fat, carbohydrates and foreign proteids, and to represent a purified product. There is some reason to suppose, however, that this chemical treatment interferes with its specific toxicity and therefore with its therapeutic value, while to our mind no valid evidence of its superiority to old tuberculin has been presented.

Bouillon filtrée of Denys differs from old tuberculin in not having been concentrated. Its theoretic basis is the belief that boiling diminishes the therapeutic value of tuberculin. If, as we believe, this is an error, then the bouillon filtrée is merely a dilute tuberculin, requiring larger doses and is much more expensive than old tuberculin. It may also be that the tubercle-bacilli splinters, that are present in old tuberculin and to which it may owe much of its activity, are produced in the process of concentration. From this point of view, the bouillon filtrée must be considered an inferior product.

Tuberculin A. F. (albumose-free) is a filtered culture of tubercle bacilli grown on a liquid medium free from peptone (albumose) and concentrated *in vacuo* at 37° C. to one-fourth of its bulk. Jochmann and Muellers report very satisfactory results from its use, but the time during which it has been used therapeutically is as yet too short to demonstrate whether it is superior to other preparations. It promises well.

Among the members of the second group, those containing the body-substance of tubercle bacilli, three deserve special mention:—

Koch's Bacillus Emulsion (B. E.) is obtained by the sedimentation of ground-up tubercle bacilli, suspended in 40 per cent. glycerine-saline solution.

Tuberculol B. (Landmann) represents a watery extract of tubercle-bacilli bodies obtained at progressively increasing temperatures.

Meyer's Sensitized Bacillus Emulsion (S. B. E.) is obtained by treating tubercle bacilli in the incubator with tuberculosis serum. They are then ground up, separated from the serum by means of centrifugation and worked up into an emulsion with 40 per cent. glycerine-water containing 0.5 per cent. phenol. The theoretic basis of this praparation consists in the fact that the tubercle-bacilli proteids are combined with the amboceptors during the process of manufacture, so that the patient's serum is relieved of this task. Whether this is a real advantage still remains to the proved. Jochmann and Wolff-Eisner deny it absolutely.

The third group contains:—

Tuberculol A introduced by Landmann. It consists of Tuberculol B to which has been added the culture fluid of various races of tubercle bacillus, concentrated *in vacuo*. It has the advantages of being homogeneous and easy of dosage, and of containing both endotoxins and products of tubercle-bacilli metabolism.

Tuberculin Béraneck consists of a mixture of tubercle-bacilli bouillon concentrated *in vacuo* with an orthophosphoric-acid extract of the bodies of tubercle bacilli. Sahli commends it very highly. It is by far the weakest of the tuberculins and very expensive.

Wolff-Eisner's Mixed Tuberculin is a mixture of Koch's old tuberculin and of B. E., both described above.

The determination of the relative value of the various tuberculins is a matter of great difficulty. For purposes of diagnosis none of them is in the least superior to the old tuberculin which may be used equally well for all of the hitherto suggested tests. When it comes to estimating the therapeutic value of tuberculin, we are confronted with the impossibility of determining what share the various factors (hygiene, diet,

rest, tuberculin) have in producing a cure or an improvement in the patient's condition. Each clinician has his favorite tuberculin which he believes to give better results than any of the others. Equally good results have been reported by competent observers with all the tuberculins, so that we may reasonably conclude that their therapeutic value does not differ greatly. The preference for one or the other variety as yet must rest chiefly on theoretic grounds; and our knowledge of the nature of tuberculin and of the mode of its action is as yet so imperfect that no great stress can be laid upon this point of view. It seems rational, therefore, to prefer that tuberculin which has been most extensively studied, is most easily managed, keeps best at all temperatures, and is cheapest. All these advantages characterize Koch's old tuberculin, and we are in accord with many of the best observers in preferring it for routine use. Nevertheless there can be no objection to the use of the other good tuberculins by anyone who happens to prefer them, provided only he uses them *lege artis,* with proper attention to dosage and freshness of the preparation, some being more concentrated and more permanent than others.

Diagnostic Use of Tuberculin.

The literature on the diagnostic use of tuberculin is large and increasing rapidly, though little that is really new has appeared within the last twelve months. In all of them, Koch's old tuberculin may be used, the others offering no advantages and their action not being so well known. The present situation may be summarized very briefly.

Cutaneous Tests.—The most useful cutaneous test is that propounded by von Pirquet. The skin of the forearm is rendered sterile by rubbing with ether or with alcohol, and a trace of undiluted old tuberculin is placed upon the skin at two points several inches apart. The skin is then lightly scarified, first at a point midway between the two drops of tuberculin, as a control, and then through each of the drops. No dressing is required. The reaction, according to Saathoff, may take one of the four following forms:—

First, there may be a maximal reaction. Twenty-four hours after the scarification, each site of inoculation presents a large papule or a dense infiltration surrounded by a bright red inflammatory areola. During the next few days, the inflammation subsides, leaving behind a dense, dark-red papule which may persist for weeks or even months. This type of reaction may be produced either by an active or inactive tuberculosis, but in either case it indicates a marked power of defense on the part of the organism and justifies a favorable prognosis.

Secondly, we may have a prolonged reaction (Dauerpapel). This is the type of reaction found in most healthy adults. On the second or third day, a dense, moderately inflamed papule appears that may persist for a long time. Saathoff believes that the denser the papule, the later it appears and the longer it lasts, the more favorable the outlook for the patient. Most of the chronic, indurated forms of phthisis react in this manner.

The *third* group behaves very differently. The first inoculation may produce no reaction. If it is repeated a reaction may result, but the papules appear early, often within six to twelve hours, are small and disappear as quickly as they came. This is the type of reaction found in advanced tuberculosis, and such cases usually do badly.

Fourthly, we may have no reaction at all, even if the inoculation is repeated. Such a result is found in individuals who have never had tuberculosis, especially in healthy children, and also in cases flooded with the toxin of tuberculosis, such as acute miliary tuberculosis, tuberculous meningitis, the terminal stage of pulmonary consumption, etc. If the diagnosis of tuberculosis is established, the prognosis of cases in this group is bad.

Whether such positive prognostic conclusions may be drawn from the type of the cutaneous reaction is a matter in which there is as yet no unanimity, the opinions against such an interpretation being quite as decided as those for it. Probably, while the sign in itself does not justify positive prognostic conclusions, it is not without value when taken in connection with the rest of the clinical picture. Certainly, in our own experience, every case of tuberculosis, that failed to react to the cutaneous test, has died within the year.

As regards the diagnostic value of the test, its importance is greatest in young children, since there it always indicates an active tuberculosis. Radziejewski reports the autopsy findings in over 350 cases of children, tested in this manner during life. His data prove that a positive reaction always indicates tuberculosis, while a negative one, in the absence of cachexia, miliary tuberculosis and meningitis, excludes tuberculosis. In infants, a positive reaction is almost inevitably of fatal prognosis, since recovery from tuberculosis in the first few years of life is rare.

The modification of the cutaneous test, such as the use of a tuberculin ointment according to Moro, the application of tuberculin upon the shaved skin according to Lignières, the application according to Barabaschi of tuberculin upon the skin previously rubbed with alcohol, are not of practical importance. The simultaneous use, as advocated by Detre, of human and bovine tuberculin is of scientific rather than practical interest.

The conjunctival test independently proposed by Wolff-Eisner and Calmette consists in the instillation of a dilute solution of tuberculin into the conjunctival sac. A resulting conjunctivitis represents a positive reaction. Recent experience with this method has led to its nearly complete abandonment. Its significance is not different from that of the cutaneous test except that it is less sensitive, it does not enable one to distinguish between active and inactive tuberculosis, and it has occasionally led to distressing ophthalmic complications.

The intracutaneous test presents some points of great interest. It was first used by Mantoux and Roux. They inject, by means of a syringe armed with a fine and very sharp needle, 0.01 mgrm. tuberculin, in a dilution of 1-5,000, not beneath but into the skin itself. A positive reaction consists in the appearance, a few hours after the injection, of a small papule; next day the infiltration is more extensive, with an inflammatory areola; on the third day, the reaction attains its maximum and then slowly subsides. Its interpretation is the same as that of the cutaneous test, except that it is more sensitive. Benker reports favorably upon Balen's modification of this test. Five intracutaneous injections are made with (*a*) ½ per cent. carbolic acid (as a control), (*b*) 1/10,000 mgrm. tuberculin, (*c*) 1/1,000 mgrm., (*d*) 1/100 mgrm., and (*e*) 1/10 mgrm. He believes that if a reaction occurs with 1/10,000 to 1/100 mgrm., the tuberculosis is active; if no reaction occurs with any of the dilutions, tuberculosis may be excluded; a reaction only to doses between 1/100 and 1/10 mgrm. indicates latent tuberculosis.

Engel uses even stronger dilutions. He first injects intracutaneously a drop of 1 to 1,000 solution of old tuberculin. If there is no reaction, he increases the concentration successively to 1 per cent., 10 per cent., and occasionally to undiluted tuberculin. A negative reaction absolutely excludes tuberculosis, since even the cachectic and advanced cases react to the stronger dilutions. Thus in a case in which the diagnosis lay between typhoid and miliary tuberculosis, a reaction to 10 per cent. tuberculin demonstrated the latter diagnosis to be the true one. In such cases both the cutaneous and the subcutaneous tests fail.

These modifications may prove of considerable value if future experience confirms the claims of their originators. For the present a somewhat sceptical attitude is the safer one.

The hypodermic method is the oldest and in most cases the most useful one. Two dilutions are made with a ½ per cent. carbolic acid solution: one containing 1 per cent., the other 0.1 per cent. of old tuberculin. Many suggestions as to dosage have been offered, but the best seems to be a slight modification of the formula originally proposed by Koch. The patient's temperature is recorded every two or three hours, and, if for three days it has not exceeded 99° F., an injection of 1/5 mgrm. tuberculin is given. In the absence of any reaction, successive injections of 1, 5, and 10 mgrm. are given at intervals of three or four days. A negative reaction is strong though not conclusive evidence of the absence of a tuberculous infection; a positive one must be interpreted according to the nature of the reaction. The latter may take on four forms:—

1. An inflammatory reaction at the site of injection (local reaction). This has much the same significance as a positive von Pirquet test.
2. A rise in temperature (febrile reaction). This is very suggestive, but not conclusive of an active tuberculosis.
3. A feeling of malaise (general reaction).
4. A reaction at the site of disease (focal reaction), characterized by the appearance of râles, sputum, abdominal pain, inflammation about areas of lupus and the like. This is the least constant but the most valuable type of reaction. It determines, not only the presence of an active tuberculosis, but also its site.

Certain precautions must be taken to render the method harmless. The patient should be kept in bed or at least confined to his room, best in a hospital or in the care of a trained nurse. If a doubtful reaction occurs, the dose of the next injection must not be increased, but the same dose must be repeated. The slightest rise in temperature forbids an increased dosage. There are at least seven definite contraindications to the hypodermic use of tuberculin for diagnostic purposes, as pointed out by Bandelier and Roepke:—

1. Fever however slight (over 99° F.) and whatever its origin.
2. Clinically certain tuberculosis, especially the presence of tubercle bacilli in the sputum.
3. Recent hemorrhages. These may be unfavorably influenced by the resulting local hyperemia of the tuberculous focus.
4. Cardiac lesions, since a strong reaction may unduly strain a much weakened heart.
5. Nephritis, since a reaction is occasionally accompanied by albuminuria.
6. Epilepsy.
7. Hysteria. Fever sometimes follows the injection of tuberculin or indeed of plain sterile water in non-tuberculous but hysterical individuals.

The Therapeutic Use of Tuberculin.

The indications for the therapeutic use of tuberculin are all forms of chronic tuberculosis in their earlier stages, no matter where they are localized. Pulmonary, glandular, ocular, urogenital tuberculosis, lupus and tuberculosis of the bones and joints, are all suitable for tuberculin therapy in properly selected cases. It almost goes without saying that all the other appropriate therapeutic measures must be combined with the tuberculin treatment. Thus in pulmonary tuberculosis, proper hygiene is far more indispensable than tuberculin; in surgical tuberculosis, operative interference is often unavoidable; in ophthalmic tuberculosis, local treatment is important; nevertheless, in all these conditions, tuberculin is a valuable adjuvant. On the whole, the more incipient the infection, the more brilliant the results of tuberculin therapy. Many writers report surprisingly favorable results even in advanced tuberculosis, but this is by no means a universal experience. We ourselves, a year ago, divided some 40 cases of advanced tuberculosis at the St. Louis City Hospital into two halves, all treated alike except that one-half received tuberculin, the other half not. It may have been a coincidence that the tuberculin group, on the average, did not do so well as the other; certainly no beneficial effect was observable. In early cases, however, in our experience, the good effects are indisputable. The use of tuberculin is contraindicated in acute tuberculosis, in tuberculous meningitis, in severe cardiac incompensation, and perhaps in epilepsy.

The technique of the procedure may be considered from three points of view: the preparation of the dilutions, the mode of administration, and the dosage.

Preparation of the Dilutions.—As a diluent, a 0.9 per cent. salt solution, containing 0.5 per cent. carbolic acid should be used. A series of dark-glass bottles, with mouths wide enough to admit a hypodermic syringe and with glass stoppers, are sterilized by boiling. Into a small sterile graduate 1 c.cm. of old tuberculin, or corresponding amounts of the other tuberculins, are placed, 9 c.cm. of the diluent are added and the mixture shaken. Of this 9 c.cm. are poured into the first bottle and the remaining 1 c.cm. again diluted to 10 c.cm. Of the mixture, 9 c.cm. are poured into the second bottle and the process repeated, so that the successive dilutions will contain 100 mgrm., 10 mgrm., 1 mgrm., 0.1 mgrm., 0.01 mgrm., 0.001 mgrm., etc. per c.cm. If kept in a cool place these solutions will keep well for a fortnight, when they should be renewed.

A simple and satisfactory method devised by us is based upon the facts that most American syringes are graduated into minims rather than into 0.1 c.cm., that it requires 22 drops of old tuberculin (Hœchst), as dropped from the little bottle in which it is marketed, to make 1 c.cm. Into the first of a series of sterile bottles, 30 c.cm. of the diluent are placed, while into each of a series of other bottles, 9 c.cm. of the diluent are put. One drop of old tuberculin is introduced into the first bottle, making a solution of which each minim contains 0.1 mgrm. tuberculin. This is shaken, and 11 drops of it are dropped into the second bottle. This in turn is shaken, and of it 11 drops are dropped into a third bottle. The process is repeated until a series of dilutions is obtained, containing respectively 0.1, 0.01, 0.001, 0.0001 mgrm. etc. per minim. The dilutions can be made in a very few minutes, are sufficiently accurate for practical purposes, and require for each series only a single drop of the original tuberculin.

If a syringe graduated into 0.1 c.cm. is used, this method may be modified by dropping one drop of old tuberculin into 45.5 c.cm. of diluent. The other dilutions are made as above. The series of bottles will then contain respectively 1, 0.1, 0.01, etc. mgrm. per c.cm.

Many of the makers of tuberculin market ready-made dilutions. Their use is not to be recommended. Not only are they unnecessarily expensive, but there is no way of controlling their freshness, and under no circumstances should a dilution older than a few weeks be used. Moreover, with these dilutions there is always a tendency to increase the dosage schematically and without reference to the patient's sensitiveness to tuberculin, a procedure much to be deprecated.

Mode of Administration.—The injections should be made well under the skin into the loose cellular tissue lying between skin and fascia. If made too superficially, painful intradermal reactions, as described above, may result. The site usually recommended is the back between the shoulder-blades or lower down, but the loose tissue of the arm, just above the bend of the elbow, offers certain advantages. It is more accessible and, while it is a fact that local reactions are more readily produced here than in the back, this is rather an advantage than otherwise in controlling the dosage of subsequent injections. All other methods of administering tuberculin (intravenously, intratracheally, by mouth, by rectum, directly to ulcerating skin lesions, etc.) are to be condemned.

Hitherto there has been a tendency to restrict the therapeutic use of tuberculin to sanatoria or to bed-fast patients. More and more, however, the general practitioner is coming to use it in his office practice, and justly so. The only requisite for its safe administration to ambulant patients is, besides the necessary skill on the part of the physician, careful self-observation on the part of the patient. The latter is instructed to keep a diary in which he records his temperature taken every three hours and any change in his general condition that he may notice. This diary is submitted to the physician at each consultation, and enables him to decide how rapidly it is safe to increase the dosage.

Dosage.—All observers are united in the belief that the dosage of tuberculin should be so regulated as to avoid all severe general reactions, but in practice two schools may be distinguished. In Germany it is customary to begin with relatively large doses, such as 0.01 mgrm. and, ignoring very mild reactions, to increase the amount injected as rapidly as possible to 1,000 mgrm. or higher. Hereby a high degree of immunity to tuberculin is established, but this is by no means identical with immunity to tuberculosis, and, except in the most skillful hands, the danger of being surprised by a violent reaction is great. In this country a more deliberate method prevails. The initial dose is often set at 0.001 mgrm. old tuberculin. After having twice seen a violent general reaction follow this dose, we are inclined to follow Pottenger in beginning with much smaller quantities, 0.000001 mgrm. or less. The best way is probably to individualize; children together with weak, frail and febrile adults requiring smaller doses than those that are relatively robust. In beginning with the smallest doses, injections should be given twice a week, increasing the dose rapidly, each dose being five or ten times its predecessor until a distinct local reaction at the site of injection is produced. This marks the point at which a real therapeutic effect begins, and thereafter the dosage must be increased more deliberately; by one-third or one-half in those that show themselves sensitive to tuberculin, more rapidly in those that are relatively obtuse. The intervals between injections are

gradually increased until, with the higher doses, the patient receives one a week. The slightest rise in temperature attributable to the tuberculin, the appearance of definite malaise or of a marked local reaction at the site of injection, contraindicates an increase in the dose. The same dose should be repeated (sometimes it must be lowered, or the interval increased, or both) until no reaction results. A slight reaction that is overlooked or ignored may be followed by a very violent one.

Opinions differ as to the maximum dose to be attained. In Germany the treatment is continued up to 1,000-5,000 mgrm. as advised by Koch. In this country the tendency is rather to follow Petruschky, who rarely exceeds 100 mgrm. In this case, however, repeated courses of treatment are advisable, each course lasting two or three months, with intervals of six months, for some two years. In practice, however, no routine limit can be set. Some patients do best with very slow increase of dosage and a prolonged course of treatment, others with shorter courses and more rapidly increased dosage. In some again it is easy to attain high doses, in others difficult or impossible. This constant need for individualization is perhaps the most striking feature of tuberculin therapy.

In the above review, Koch's old tuberculin has been taken as the type, especially in considering the treatment. If other tuberculins are used the same precautions and nearly the same technique are indicated. The difference is chiefly one of dosage, some tuberculins being more, and some less, active.

THE ETIOLOGY OF ECLAMPSIA.

A CRITICAL REVIEW OF RECENT LITERATURE.

By Hugo Ehrenfest, M. D., of the Editorial Staff.

1. Ahlfeld: Pathogenesis of Eclampsia. (*Zeitschr. fuer Geb. und Gyn.*, Vol. 63, p. 295.)
2. Alsberg: Two Contributions to the Eclampsia Problem. (*Zentralbl. fuer Gyn.*, p. 6, 1910.)
3. Anderson and Rosenau: Further Studies on Anaphylaxis. (Hygienic Laboratory,—Bulletin No. 45. Public Health and Marine Hosp. Service of the United States, June, 1908.)
4. Beer: Etiological and Clinical Relation of Eclampsia to Nephritis. (Abs. *Zentralbl. fuer Gyn.*, p. 646, 1910.)
5. Beuthe: Repetition of Eclampsia in Succeeding Pregnancies. (Abs. *Zentralbl. fuer Gyn.*, p. 622, 1910.)
6. Cauwenberghe: Etiology of Eclampsia. (Abs. *Amer. Journ. Obstet.*, Vol. 59, p. 881.)
7. Cova: Eclampsia in Multiparæ. (Orig. in Italian; Abst. *Zentralbl. fuer Gyn.*, p. 900, 1908.)
8. Dienst: Etiology of Eclampsia. (*Zentralbl. fuer Gyn.*, p. 438, 1911.)
9. Donath: Lactic Acid and Eclampsia. (*Berl. klin. Wochenschr.*, No. 7, 1907.)
10. Drennan: Abstraction of Calcium Salts from the Mother's Blood by the Fetus the Cause of Puerperal Eclampsia in the Former. (*Amer. Journ. Obstet.*, p. 653, April, 1911.)
11. Engelmann and Stade: Placental Theory of Eclampsia. (*Zentralbl. fuer Gyn.*, p. 618, 1909.)
12. Fellænder: Is Eclampsia an Anaphylactic Phenomenon? (*Zeitschr. fuer Geb. und Gyn.*, Vol. 68, p. 26.)
13. Frankl and Richter: Cobralysis in Eclampsia. (*Gyn. Rundschau*, p. 263, 1911.)
14. Gozony and Wiesinger: Pathogenesis of Eclampsia. (Orig. in Hungarian; Abs. *Zentralbl. fuer Gyn.*, p. 678, 1910.)
15. Græfenberg: Anaphylactic Relations between Fetus and Mother. (*Zeitschr. fuer Geb. und Gyn.*, Vol. 69, p. 270.)
16. Guggisberg: Experimental Investigations Concerning the Relation of Eclampsia to Anaphylaxis. (*Zentralbl. fuer Gyn.*, p. 963, 1911.)
17. Hirschberg: Symptoms of Hypersensitization in Pregnancy. (*Berl. klin. Wochenschr.*, April 10th, 1911.)
18. Hofbauer: Placental Theory of Eclampsia. (*Zentralbl. fuer. Gyn.*, p. 1469, 1908.)
19. Hofbauer: Reply to Article by Alsberg. (*Zentralbl. fuer Gyn.* p. 413, 1910.)

20. Holland: Recent Work on the Etiology of Eclampsia. (*Journ.
     Obstet. of Brit. Empire,* p. 255, 1909.)
21. Jacobson: Treatment of Eclampsia by Continuous Sugar-Water
     Instillation. (*Amer. Journ. Obstet.,* Vol. 61, p. 871.)
22. Lichtenstein: Critical and Experimental Studies Concerning the
     Toxicology of Placenta, etc. (*Archiv. fuer Gyn.,* Vol. 86, p. 434.)
23. Lichentenstein: Placental Theory of Eclampsia. (*Zentralbl. fuer
     Gyn.,* p. 265, 1909.)
24. Maire: Maternal Eclampsia of Paternal Origin. (Orig. in French;
     Abs. *Zentralbl. fuer Gyn.,* p. 1424, 1907.)
25. Mathes: Toxicology of Placenta. (*Zentralbl. fuer Gyn.,* p. 1548,
     1908.)
26. Mirto: Etiology of Eclampsia. (Orig. in Italian; Abs. *Journ.
     Obstet. Brit. Empire,* Vol. 15, p. 63.)
27. Mitchell: Theory of Eclampsia. (*Medical Record,* November
     19th, 1910.)
28. Mohr and Freund: Pathogenesis of Eclampsia. (*Berl. klin.
     Wochenschr.,* No. 40, 1908.)
29. Mohr and Freund: Oleic Acid in the Etiology of Eclampsia.
     (*Monatsschr. fuer Geb. und Gyn.,* Vol. 33, p. 757.)
30. Polano: Oleic Acid as Cause of Eclampsia. (*Zeitschr. fuer
     Geb. und Gyn.,* Vol. 65, p. 581.)
31. Roth: Influence of Weather Conditions on Eclampsia. (Orig.
     in Russian; Abs. *Amer. Journ. Obst.,* Vol. 55, p. 691.)
32. Schlichting: Eclampsia and Weather Conditions. (*Archiv fuer
     Gyn.,* Vol. 89, p. 385.)
33. Thies: Etiology of Eclampsia. (*Archiv fuer Gyn.,* Vol. 92, p.
     513.)
34. Wolff-Eisner: Eclampsia. (*Berl. klin. Wochenschr.,* November
     6th, 1911.)
35. Zweifel: Is Lactic Acid in Blood and Urine the Result of Con-
     vulsions? (*Zentralbl. fuer. Gyn.,* p. 897, 1909.)

The interest in eclampsia seems general. Conservatively estimated,
probably not less than four hundred papers have been published within
the last three years dealing with some of the various phases of this
rightly dreaded complication of pregnancy. The result of all the work,
assiduously pursued in this country and abroad by the best of scientific
workers, must prove disappointing, though full of interest to the student
of modern medical literature. Eclampsia more than ever is the disease
of theories, as once so very appropriately called by Zweifel. In my opin-
ion, nothing proves more conclusively our present ignorance concerning
the true cause of eclampsia than the fact that quite recently a French
writer, Maire (24), seriously suggested the possibility of a paternal
origin of maternal puerperal eclampsia. In the light of the very latest
contributions, however, such a suggestion may contain a trace of justi-
fiability, although never thought of by that French contributor. If
eclampsia, as now is claimed by some writers, is the expression of an
anaphylactic condition, the paternal sperm portion of the developing em-
bryo probably would represent the resorbed alien proteid sensitizing the
pregnant woman.

The renal theory of eclampsia, one of the oldest, still finds its defenders.
Ahlfeld (1) tries to prove that there is no eclampsia without a preced-
ing insufficiency of renal function. In primigravidæ this interference with

normal function usually is due to mechanical, and less commonly to toxic, causes, while in multigravidæ, almost without exception, the cause is found in a chronic diseased condition of the kidneys. A relation between climate and eclampsia has repeatedly been suggested by some writers, often disclaimed by others. The fallacy of an attempt to prove the existence of such a relation, simply by statistics of eclampsia cases, has recently been shown by Schlichting (32). Roth (31), however, still maintains that unpleasant, warm, wet weather increases the number of eclampsias, simply because such weather has a recognized bad influence on renal diseases. Jacobson (21) holds the certainly antiquated belief, that in eclampsia we are dealing with uremia caused by a nephritis, and that pregnancy, labor or the puerperium are mere coincidents which also may exert some harmful effect on the organism. Incidently, he remarks, in this paper that signs of a nephritis are almost never failing. He at least has never seen such a case, and he is not willing to place any reliance in the claim of some authors of an eclampsia without urinary changes, because "they probably have copied from others." We could refer Jacobson to an article by Beer (4) who has collected a number of typical cases of eclampsia with normal urine, and also gives the records of 3 fatal cases in which post-mortem examinations established the presence of perfectly normal kidneys. Beer is forced to the conclusion that the renal lesions, so commonly found, are the expression of a secondary impairment of these organs, but do not play a rôle in the actual causation of eclampsia. Against the nephritis theory there is also the well-known fact that eclampsia is so much more common in primigravidæ; according to Cova (7) occurring in primigravidæ from five to eight times more often than in multigravidæ; furthermore, that the recurrence of eclampsia in a subsequent pregnancy is rather rare. Beuthe (5) studied particularly this last problem and draws from 53 cases of repeated eclampsia in the same patients the following conclusions: (1) It seems improbable that through recovery from an attack of eclampsia an immunity is acquired; (2) the theory that recurrence of eclampsia in the same patient is due to a chronic nephritis is not based on clinical facts; (3) the comparative rarity of second attacks may be due to the fact that succeeding pregnancies are likely to end prematurely as the result of the death of the fetus. Cauwenberghe (6) also sees in the common and typical hepatic and renal changes only secondary effects but not causative factors of the disease. It is his theory that, on the other hand, the usual disturbances of digestion, such as nausea, vomiting and intestinal symptoms, instead of being the result of a toxemia, are indeed responsible for the development of the toxins which finally lead to eclamptic seizures. He evades the very obvious questions, What the cause may be of these common gastric disturbances during pregnancy, and why identical symptoms never are accompanied by convulsions in non-pregnant women, or in men.

In most of the present theories of eclampsia, the placenta plays an important rôle. Lichtenstein (22) classes the theories assuming a placental origin of the eclampsia toxins into four groups: (1) According to Veit, who was the first to base an eclampsia theory on Ehrlich's work on immunization, the disease is caused by the deportation of a large amount of fetal tissue, in form of detached chorionic villi or masses of syncytium, into the maternal blood; (2) according to Ascoli, the resulting syncytiolysins; (3) according to Weichardt, syncytiotoxins liberated by the lysins represent the responsible toxic substance; and (4) Liepmann finally claims that the toxins are formed in the villi themselves. In Lichtenstein's be-

lief, the theories of Veit, Ascoli and Weichardt to-day must be considered exploded by the work of many other investigators. He himself undertook to control the experiments of Liepmann, and comes to the conclusion that they were faulty in so many respects that they must be regarded unconvincing. Considering briefly also Hofbauer's new enzyme theory, he deduces finally that at present all placental theories stand unproved or are untenable, and in another article (23) defends his attitude against attacks made by Hofbauer and Liepmann. Lichtenstein does not refer to another new placental theory, which, however, does not seem very plausible. Mirto (26) found that the relation in the weight of the fetus to that of the placenta in eclampsia is constantly less than in other cases. He bases on these findings the hypothesis, that a relative placental insufficiency may allow the passage into maternal circulation of certain fetal waste-products, usually neutralized by placental secretions.

Answering Christea and Bienenfeld, Dienst(8) recently reviewed newer investigations of the blood, urine and amniotic fluid of eclamptic, normal pregnant and puerperal women, and finds that these investigations support his own theory of an abnormal increase of fibrin-ferments and fibrinogenous substances in the blood of eclamptics. He concludes that the toxic substance, which during pregnancy produces hydrops and albuminuria, is fibrin-ferment retained in abnormal quantity in the blood after having been set free there as the result of the physiological destruction of polynuclear leucocytes during pregnancy. It is obvious that this presence in the blood of an abnormal amount of fibrin-ferment would help to explain the almost typical post-mortem findings of eclampsia, characterized by the formation of thrombi in various organs. In this particular aspect experiments of Mathes (25) support Dienst's theory. Ever since Schmorl, by means of intravenous injections of emulsions made from placental tissue, produced serious diseases and even caused the death of the injected animals, the placenta has been regarded as an organ rich in toxic substances. Mathes found that placental juice may prove fatal even in great dilution, and that the extensive formation of thrombi found after death, therefore, probably is not due to a toxic substance, but to one favoring the formation of thrombi. Continuing Mathes' studies, Engelmann and Stade (11) contended that if the harmful material contained in placental juice is a substance fostering coagulation and thus thrombosis, this effect possibly could be eliminated by the addition of some other substance which lowers the coagulability of the blood. Following this idea, they first experimented successfully, and later introduced into therapy, hirudin, an extract made from leeches.

The common association of hemoglobinemia and hemoglobinuria with severe cases of eclampsia induced Mohr and Freund (28) to look for a hemolytic substance. They found in placentas a lipoid in form of oleic acid. Its inherent hemolytic power is restrained by human serum, lecithin and cholesterin in certain concentrations. Thus these investigators were the first to succeed in determining chemically a toxin in the placenta. Polano (30), from quantitative chemical analyses, animal experiments, and from clinical and anatomico-pathological findings, concludes that the theory of Mohr and Freund is untenable. Answering in another paper (29), these authors point out that they never intended to explain eclampsia as an oleic-acid intoxication, but were interested solely in the one phenomenon of eclampsia, i. e., hemolysis, which, in their belief, is satisfactorily explained by the presence of oleic acid in the blood.

Hofbauer (18) does not believe in a special toxicity of placental tissues,

but assumes an occasional introduction into the maternal circulation of an abnormal amount of enzymes normally present in the placenta. This introduction possibly stands in some connection with the generally acknowledged deportation of placental tissue into the maternal system in the course of pregnancy. These enzymes, in his belief, effect a partial intravital autolysis which leads to the typical liver changes of eclampsia. The substances forming as the result of this autolytic process prove toxic for the maternal organism. If Hofbauer's theory is correct, Alsberg (2) contends, the presence of hepatic lesions should become evident by a positive levulose test of Strauss, who found that in cases of functional disturbances of the liver after the administration of 100 grm. of levulose, 90 per cent. of the patients exhibit an alimentary glycosuria. He made the Strauss test in 8 cases of eclampsia, and found it negative in all of them. Hofbauer (19) states, in defending himself against Alsberg, that the latter made his tests during the convulsive state, when renal insufficiency probably causes an inadequate elimination or even a complete retention of the sugar. He himself made the Strauss test in 3 cases twenty-four hours after delivery, and found it positive in every instance. The very interesting investigations of Frankl and Richter (13) also confirm indirectly Hofbauer's theory. They studied the hemolytic effect of the blood-serum of normal pregnancy and of eclampsia on cobra poison —horse serum. It is generally assumed that the reaction in cobralysis is chiefly dependent upon the presence of lecithin-like bodies in the blood. If this is correct, Frankl and Richter have ascertained that the blood of eclamptic patients contains an increased amount of lecithin. The abundance of lecithin is the expression of extensive cell destruction, probably the result of autolytic processes caused by the increased introduction of fetal ferments into the maternal system. Holland (20) states, in his critical review of recent work on the etiology of eclampsia, that "in the light of present knowledge, the most probable theory of the cause of eclampsia is an intoxication of the body by the passage of ferments and autolytic products from the placenta into the circulation, the principal effect of which is increased coagulability of the blood and the activation of autolytic ferments in other parts of the body."

The lactic-acid theory of Zweifel has been discredited by various writers. One of the strongest arguments against the theory is found in the observation that an excess of lactic acid is a very common, if not a regular, occurrence in all diseases appearing with convulsions. Donath (9) was unable to detect lactic acid in the spinal fluid of eclamptic patients, and also failed in animal experiments to produce convulsions by the injection of lactic acid into the blood. The presence of lactic acid in the blood in eclampsia, in his opinion, is due to a surplus suddenly formed in the muscles during convulsions. Zweifel (35) argues against Donath and others that the urine of women, exhibiting only the symptoms of a pregnancy kidney, also contains lactic acid, and that this acid is found in cases of pregnancy nephritis in the blood obtained by means of a venesection. On the other hand, not every case of epilepsy after a convulsive state shows a lactaciduria.

Mitchell (27) accepts McCallam's claim that tetany is due to deficiency in calcium. In comparing eclampsia with tetany he comes to the conclusion that in eclampsia such a deficiency is still more pronounced. In his opinion, it finds its expression in the decay of the teeth, in the possible development of an osteomalacia, in the not uncommon craving of patients for chalk, slate-pencils, etc. Similar views we find expressed

in an article by Drennan (10). She thinks that the fatty infiltration of the liver-cells around the hepatic veins is not a physiological condition during pregnancy and lactation, as commonly claimed, "but a pathological state due to the abstraction of calcium salts from the mother's blood by the fetus, in such quantity, as to deprive the mother of what should rightfully he hers so as to unite with the fatty matter in her liver-cells to form lipoids—soluble fats—which then would be conveyed by her circulation to be deposited in tissues normally the dépots of free fat, and also as a source of fat for the fetus." As the result of a disturbed liver function, toxins are formed on account of imperfect protein digestion. The circulation of these toxic substances through the liver, by way of a vicious circle, aggravates the fatty degeneration and further impairs liver function until the gravest forms of toxemia result.

In the opinion of some enthusiastic—as it seems over-enthusiastic—recent contributors the ever-puzzling problem of the causation of eclampsia now is definitely settled. Eclampsia is a phenomenon of anaphylaxis.

The introduction of a soluble alien, heterologous proteid parenterally, *i. e.*, by some other route than the alimentary canal, renders the injected animal hypersensitive after a refractory period of incubation varying in different animals, but being approximately from eight to ten days. If after this refractory period, a second and even smaller dose of the same foreign proteid is injected (intramuscularly, intravenously, or intraperitoneally), the hypersusceptible animal reacts promptly with symptoms of a very grave character, often with immediate death due to asphyxiation. It is assumed that the first dose of the foreign proteid (antigen) leads to the gradual increase of specific antibodies already normally present in the blood in small quantities. If, after the refractory stage, another dose of this proteid is introduced, the antibodies now present in large quantities, produce a rapid disintegration of the injected proteid, probably into the same products as it would yield during intestinal digestion. While in the latter process, however, these products undergo further cleavage before being resorbed, in the former they are liberated directly into the blood-stream. These products are toxic and promptly lead to a condition known as anaphylactic shock.

To Anderson and Rosenau (3) belongs credit for being the first to suggest the possible relation of anaphylaxis to eclampsia. They wrote, in 1908, "the symptoms which cause puerperal eclampsia and the conditions under which it occurs suggest that anaphylaxis may explain some of the mystery of this state. It occurred to us that either the blood or proteid substances in solution from the fetus or placenta may first sensitize the mother. A subsequent introduction into the system of the mother of a similar substance may explain the convulsions and the symptoms which occur in a certain class of toxemias."

From a series of experiments it seems evident to them that the mother guinea-pig may be sensitized with the autolytic products of her own placenta. These experiments naturally suggest that there may be a certain relation between some cases of puerperal eclampsia and the phenomena thus found in the guinea-pig.

It would be impossible to give, in the following, a complete review of the numerous contributions since made to the question of the possible or probable relation of eclampsia to anaphylaxis. The technique of animal experiment is complicated, and many of the contributions are criticisms of the particular technique employed by another experimenter and at-

tempts to defend certain results which are directly contradicted by others. Often, and undoubtedly with good justification, the argument is raised that the results obtained in the animal experiment do not permit conclusions as to conditions in the human being, especially in view of the undeniable fact that marked differences in the phenomena of anaphylaxis can be observed in animals of different species. Nevertheless, certain positive facts have been established which make it seem probable that certain symptoms of toxemia during pregnancy may be due to a hyper sensitization developed during gestation.

The anatomical basis for the parenteral introduction of proteid during pregnancy, in the opinion of most writers, has been furnished by Schmorl and others, who established the fact of deportation of chorionic tissue into the maternal system as a normal occurrence.

The main difficulty was presented in the necessary proof that fetal tissues prove heterologous, i. e., foreign towards the mother. Histological and biological differences between fetal and maternal blood are well known. Wolff-Eisner (34) reminds us of the fact that chorionic tissue, like every fetal tissue, contains a definite paternal constituent. This makes the assumption of heterology more acceptable, especially in view of certain experiments made by Friedberger and others proving that semen may prove toxic to the very individual from whom it is taken. He also calls attention to the noteworthy fact that the symptoms of sperma resorption, e. g., in cases of sexual abstinence, like the symptoms of anaphylaxis, are chiefly due to vasomotor disturbances. Wolff-Eisner suggests that we probably will have to change somewhat our views concerning the necessity of heterology. He is, however, convinced that the required proof for an existing heterology between fetus and mother has been established by the experiments of Thies (33). Thies injected the blood-serum of feti into pregnant and non-pregnant rabbits, and found that definite clinical and pathologic-histological symptoms closely resembling those of anaphylaxis are produced in pregnant rabbits after the first injection; in non-pregnant rabbits, as a rule, only after the second injection. These experiments would prove that a rabbit can be sensitized with fetal blood, and that the pregnant rabbit is in a condition of hyper-sensitization. It may be stated here, that Fellænder (12) repeated these and other experiments, but was unsuccessful in his attempts to sensitize guinea-pigs with either placental extract, fetal serum or milk. He was unable to render guinea-pigs passively sensitized against amniotic fluid or placental extract by means of eclamptic blood-serum; and concludes that he has utterly failed in confirming any of the experiments which apparently prove the relation of eclampsia to anaphylaxis. His experiments with amniotic fluid were prompted by the claim of Gozony and Wiesinger (14) that the hypersusceptibility of the pregnant woman is due to a resorption of amniotic fluid. It is an established fact that the injection of serum of a sensitized animal into another at once renders the second animal passively hypersensitive. They attempted, therefore, to produce a passive anaphylaxis by injecting into a guinea-pig the serum of an eclamptic patient; and obtained the signs of an anaphylactic shock by injecting the amniotic fluid of the same patient two days later. Their experiments thus apparently established the proof that the hypersensitization of the eclamptic patient was due to a resorption of amniotic fluid, a claim, which, as stated, Fellænder was unable to confirm. On the other hand, we find Græfenberg (15) supporting Thies in every detail of his work. He is convinced that the pregnant animal under physiological con-

ditions is hypersusceptible to the homologous fetal serum. If we thus assume that during pregnancy the maternal blood contains simultaneously fetal antigen, being continuously absorbed, and its antibodies, we would expect to find the maternal blood-serum abnormally toxic. This is not the case. Abnormal toxicity is found only immediately after birth. Græfenberg offers the following explanation for this fact: The development of the toxic antiserum, as generally acknowledged, requires a definite time of incubation. Introduction of antigen during the period of incubation actually may lead to a temporary reduction of toxicity, the so-called "negative phase." In pregnancy, fetal antigen is continuously introduced into the maternal system parenterally; therefore, the mother's blood cannot attain the high toxicity of an antiserum during pregnancy itself, but only after labor, when further antigen introduction is stopped.

In my opinion, this very explanation seems to contradict and actually to explode the claim made by most of the writers that the eclamptic attack, appearing during labor, is an anaphylactic shock due to the sudden introduction into the maternal system of large quantities of fetal antigen, either in form of chorionic tissue, fetal serum, or amniotic fluid under the influence of the uterine contractions. If Græfenberg is correct, only the explanation of Thies for eclampsia developing after labor in the puerperal state remains acceptable. In his opinion, a considerable quantity of fetal blood-serum is retained in the uterine blood-vessels. If, as the result of manipulations, or change of position of the uterus, or through uterine contractions caused by breastfeeding even some time after labor, this retained fetal antigen is suddenly thrown into the mother's blood, eclamptic convulsions may be the immediate result. Thies also suggests that eclampsia in the fetus is caused by a passive anaphylaxis due to the transition of hypersensitized blood-serum from the mother to the fetus. Hirschberg (17) also assumes that during pregnancy, through the resorption of the heterologous sperma-proteid participating in the development of the embryo, a hypersusceptibility is effected which finds its expression in some of the common molimina of pregnancy, such as hyperemesis, urticaria, or albuminuria, and, in extreme cases, eclampsia. Identical views are expressed by Wolff-Eisner. He states correctly that, in the present state of the problem, it makes very little difference whether the fetal antigen is introduced in the form of deported chorionic tissue, fetal blood-serum or amniotic fluid, but feels that these two latter factors certainly cannot be of importance in the explanation of such anaphylactic toxic symptoms as hyperemesis or urticaria, usually appearing very early in pregnancy. He calls attention to another noteworthy fact—namely, that anaphylactic symptoms are most pronounced in disturbances of the vasomotor centres and that, therefore, women already endowed with an unstable vasomotor system will be more liable to develop the more or less serious disturbances common in pregnancy.

Fellænder, who in all his various experiments failed so completely to find any confirmation for the assumption that eclampsia is due to anaphylaxis, also emphasizes the following important facts: While anaphylaxis is characterized by a marked reduction of coagulability of the blood, an increased coagulability is generally acknowledged to exist during eclampsia. For the anaphylactic state, leucopenia; for eclampsia, leucocytosis is the rule. In anaphylaxis the blood-pressure is lowered; in eclampsia almost without exception increased. At least in guinea-pigs during anaphylaxis the temperature is markedly lowered, while in the serum disease of the human being the temperature is always above nor-

mal. In the latter disease, albuminuria is rare, while it is the rule in eclampsia. Guggisberg (16) finds that the blood-serum of eclamptic patients does not give the biological reactions typical for anaphylactic conditions, and that the toxic substances of the placenta positively are different from the products of proteid disintegration, which are closely related to the peptones. He concludes that, therefore, eclampsia cannot be an anaphylactic shock.

An unbiased critical review of all the available literature thus seems to force us to the very disappointing conclusion, already indicated in my introductory remarks, that some of the advocates of the anaphylactic theory undoubtedly are over-enthusiastic, and that eclampsia still remains the "disease of theories." [The INTERSTATE MEDICAL JOURNAL for April will present a critical review of literature on "Modern Tendencies in the Therapy of Eclampsia."—EDITOR.]

THE RELATION OF DISEASES OF THE EYE TO THE ACCESSORY SINUSES OF THE NOSE.

A REVIEW OF RECENT LITERATURE.

By WILLIAM B. CHAMBERLIN, M. D., of the Editorial Staff.

1. Francis and Gibson: The Sphenoidal Sinus as a Possible Etiological Factor in the Production of Retrobulbar Neuritis from an Anatomical Standpoint. Observations on 60 Specimens. (*Ophthalmic Record*, December, 1908.)
2. Gibson: The Sphenoidal Sinus. (*Journ. Amer. Med. Assoc.*, December, 1908.)
3. Hajek: Nebenhœhlen der Nase.
4. Holmes: Diseases of the Accessory Sinuses and Their Relation to Pathological Changes of the Eye and Orbit. (*Laryngoscope*, November, 1908.)
5. Knapp: A Study of the Anatomic Relations of the Optic Nerve to the Accessory Cavities of the Nose. (*Annals of Otol. Laryn. and Rhinol.*, June, 1909.)
6. Murphy: Visual Disturbances Showing a Causative Relation to Diseases of the Sphenoidal Sinus. (*Laryngoscope*, November, 1907.)
7. Onodi: The Optic Nerve and the Accessory Cavities of the Nose. (*Annals of Otol. Laryn. and Rhinol.*, March, 1908.)
8. Onodi: The Optic Nerve. (Wm. Wood and Co., 1910.)
9. Onodi: Die Eroeffnung des Schædelhoehle und Freilegung des Gehirns von den Nebenhoehlen der Nase aus. (*Zeitschr. fuer Laryngologie, Rhinologie und ihre Grenzgebiete*, IV, 1, 1911.)
10. Posey: The Accessory Sinuses of the Nose from an Ophthalmological Standpoint. (*New York Med. Journ.*, March, 1907.)
11. Posey: The Ophthalmological Phase of Diseases of the Accessory Sinuses of the Nose. (*Medical Record*, August, 1907.)
12 Zarniko: Krankheiten der Nase.

When one considers the enormous extent of the accessory cavities of the nose and their intimate relation to the several walls of the orbital cavity, the wonder is, not that diseases of the eye should be so occasionally associated with accessory sinus disease, but, as stated by Posey, that the accessory sinuses of the nose should ever be severely diseased without the eye and its adnexa participating. That this intimate relation should have for so long a time received such slight attention reflects but little to the credit of those specializing in ophthalmology and rhinology. This tardiness of early recognition has, however, been partially atoned for by the attention and careful investigation which have been devoted to the subject in more recent years by both concerned.

Often the entire orbital roof is formed by the floor of the frontal sinus, while the internal and inferior walls are in direct relation with

the ethmoid labyrinth, as well as the sphenoid and maxillary sinuses. These walls may vary from paper thinness to a thickness of a few millimetres. Dehiscences in the walls are not uncommon, so that the periosteum lining an accessory cavity of the nose comes into immediate contact with that of the orbit. Francis and Gibson, from an examination of sixty skulls, estimate that in one-third of all cases the bones are but one-hundredth of an inch in thickness. The same authors call attention to the fact that frequently a third of the extent of the optic nerve lies in immediate contact with the sphenoidal sinus or a posterior ethmoid cell. Not infrequently the nerve presents as a distinct ridge in the sphenoidal sinus wall. Loeb divides the nerve into two portions, (1) a free and (2) sphenoidal.

Murphy calls attention to the fact that a dacryocystitis is, in many cases, merely a symptom of nasal disease, and that in treating the condition at hand without first relieving the condition in the nose our efforts are wasted. Suppuration too around the tear-sac is largely due to necrosis of the walls of the accessory sinuses. One of the most typical of associated diseases is, of course, the well-known mucocele of the ethmoid or frontal sinuses, with the resulting swelling to the inner side and above the eye, the latter accordingly being displaced downward and outward.

Orbital abscess can result from empyema and infection of any of the accessory sinuses, though it is probably most commonly due to infection from the ethmoid. The mode of infection in such cases may be direct and due to continuity, or may be either blood- or lymph-borne. Infection of the sinuses may be through the natural openings, the mucosa forming their lining being merely an extension of that lining the cavity of the nose; or it may be through the blood- and lymph-channels. That accessory sinus disease is far more common than is ordinarily supposed is shown by the statistics of Darling, quoted by Murphy. In a series of autopsies performed at the Ancon Hospital in Panama, "92 per cent. of all cases dying of pneumococcus infection showed accessory sinus disease." Most cases of accessory sinus disease are undoubtedly due to infection from the influenza bacillus. Retrobulbar neuritis, as well as orbital abscess, not infrequently results. Posey in speaking of this class of infections remarks that "these are the cases which were observed in earlier years following grippe and in association with catching cold or rheumatism, and, in place of the simple and efficient treatment directed to the sinus, received active and often depressing and harmful general medication. As a consequence blindness was not infrequently the result, whereas with a proper appreciation of the conditions at the origin of the neuritis complete recovery might have been the question of but a few days." Knapp quotes Birch-Hirschfeld to the effect that "nearly all orbital inflammations are due to accessory sinus empyema;" and Murphy calls special attention to the fact that a unilateral affection of the orbit is undoubtedly due to sinus infection, while a bilateral involvement points to some intracranial cause. Posey remarks that "displacement of the globe of the eye and orbital abscess as occasioned by sinusitis is a matter of almost weekly experience. Edema of the lids has shown itself to be a frequent index of the existence of sinus disease in many instances. The significance of this sign cannot be overestimated." Most authors call special attention to the relation of retrobulbar neuritis to accessory sinus disease. It is not necessary that the bone be involved, as the infection may be borne through the blood- or lymph-channels. According to Posey, "simple congestion is sufficient to cause ocular symptoms without the presence of pus. Sphenoiditis and ethmoiditis may excite retrobulbar

inflammation of the optic nerve of varying degrees of intensity, as well as paresis and palsies of the ocular muscles. The nerve-sheath and two layers of periosteum may be affected by contiguity of tissue inflammation, varying from simple edema to acute retrobulbar inflammation."

Loeb considers "that optic nerve involvement without periorbital abscess is common enough to merit consideration in sinus affections." He regards the sphenoidal sinus as the most prolific cause of optic nerve infection, though in certain cases the infection may be more likely due to involvement of the posterior ethmoid cells.

Among the physical signs and eye symptoms arising from accessory sinus disease may be mentioned "diminution in light sense, fullness in the eye, some pain on rotation and attempts at pushing the globe back into the orbit," in optic neuritis. Knapp also mentions central scotoma. Kuhnt reports three cases of thrombosis of the central vein of the retina from maxillary sinus inflammation. He mentions further epiphora, blephorospasm, reflex neuroses, dacryocystitis and fistula of tear-sac. Posey again calls attention to the importance of edema of the lids, it being "most marked in the upper lid and on the nasal side. This must be distinguished from swelling and thickness due to cellulitis. It is not inflammatory in origin and most marked in the morning." The ocular muscles may be involved as a result of the intimate relation of their motor nerves to the cavity of the sphenoid. In one case of ethmoid disease the conjunctiva was turgid and studded with follicles, while there was a dendriform ulcer on the cornea. Refractive errors may result from pressure on the bulb, or indirectly from congestion and spasm of the ciliary muscle. Diplopia may result if the displacement is sudden, but is usually lacking if this comes on more gradually.

Both Posey and Onodi call special attention to the importance of rhinological examination. To quote the former, "careful rhinological examination should be made in all suspected cases, and the possibility only dismissed after *repeated* examinations have failed to discover any disease within the cells." Onodi is even more radical and says, "in those cases of sight derangement in which the oculist cannot confirm the cause, and the suspicion of nasal connection exists, even though the findings be negative, it seems well to take exploratory measures and to seek the cause, whether or not the presence of latent foci is suspected."

IMPLANTATION OPERATIONS AS SUBSTITUTES FOR SIMPLE ENUCLEATION OF THE EYE.

A REVIEW OF RECENT LITERATURE.

By John Green, Jr., M. D., of the Editorial Staff.

1. Alling: Transplantation of Fat into Tenon's Capsule after Enucleation. (*Ophthalmic Record*, March, 1910.)
2. Haseltine: Use of Catgut-Ball as Substitute for Simple Enucleation. (*Journ. Ophthal. Otology and Laryng.*, Vol. XVII, p. 271.)
3. Ibershoff: The Use of a Mass of Fatty Tissue as a Stump in Ocular Prosthesis. (*Ophthalmic Record*, March, 1910.)
4. Knapp: Fat Implantation in Tenon's Capsule after Enucleation. (*Archives of Ophthalmology*, Vol. XL, p. 296, 1910.)
5. Lauber: Enucleation with Implantation of Fat. (*Zeitschr. fuer Augenheilk.*, May, 1910.)
6. Marx: On the Implantation of Fat after Evisceration and Enucleation. (*Archiv fuer Augenheilk.*, April, 1910.)
7. Schmidt: On the Solution of the Problem of Mules' Operation. (*Zeitschr. fuer Augenheilk.*, April, 1910.)
8. Schoute: Implantation of Sterilized Bone Sphere after Enucleation. (*Klin. Monatsbl. fuer Augenheilk.*, p. 130, July.)
9. Sweet: Implantation of a Metal Ball in Tenon's Capsule (Frost-Lang Operation) with Report of 48 Cases. (*Trans. Amer. Ophthalmological Society*, Vol. XII, Part II, 1910.)
10. Terrien: Frost's Operation and Transplantation of Eye of Rabbit. (*Soc. Ophtal. de Paris*, February 7th, 1911.)

In 1841 Bonnet and Ferrall almost simultaneously published identical methods of enucleating the eye-ball, which, with slight modifications, have been generally adopted by operators. This operation marked a great advance in technique and left little to be desired as far as rapid operative recovery was concerned. The prosthesis, when first inserted, had a certain amount of lateral and up and down motion, and the deformity was comparatively slight. After a lapse of several months, however, the cosmetic result was far from pleasing. The orbital tissues were in part converted into connective-tissue, and hence the socket became deeper and deeper. In extreme cases, the upper eyelid sunk back so that there was a conspicuous depression under the upper rim of the orbit, not obliterated even when a prominent artificial eye was worn.

From time to time various procedures have been suggested with a view to diminishing or entirely obviating this deformity. Many eyes are removed for cosmetic reasons alone, and it must be discouraging to surgeon and patient alike to find that the appearance, not only is not improved, but is rendered worse within a short time after operation.

In 1885 Mules devised his operation of inserting in the scleral cup a glass sphere held in place by scleral sutures. Thus was formed a large

solid movable stump which served as a thoroughly satisfactory bed for an artificial eye.

This operation at first met with pronounced favor and was pretty generally practised, especially in England. Soon, however, reports of sympathetic disease, developing at different periods after Mules' operation, served to deter more cautious operators and the operation fell into disfavor.

Within the past two years various operators have sought, by implanting various substances, solid and semi-solid, into Tenon's capsule, to create a more or less solid stump so as to serve as a bed for the prosthesis. Efforts in this direction have been along two lines: (1) the implantation of solid balls (mainly glass, gold, or platinum), or (2) the implantation of fat tissue into Tenon's capsule and the suturing of the recti tendons over the implanted mass.

Sweet reports the implantation of a metal ball in Tenon's capsule (the so-called Frost-Lang operation) in 48 cases. The balls (mostly gold) varied in diameter from 13 mm. to 15 mm., the 14 mm. size being those found best adapted for adults. Most of the patients were able to leave the hospital a week after operation. In the few cases in which the central portion of the wound failed to unite, healing was brought about by repeated touchings with the mitigated silver nitrate stick. In only two cases did the metal ball escape. Sweet is convinced that there is no greater risk of sympathetic ophthalmitis after this operation than there is after ordinary enucleation of the eye. Should that complication make its appearance, he believes it would have occurred no matter what operation had been adopted. Inasmuch as the entire eye-ball is removed, it is likely that all structures concerned in the causation of sympathetic disease are absent. Measurements of the arcs of rotation of the artificial shell in 12 cases showed an average upward rotation of 23°, downward of 40°, inward of 21°, and outward of 19°, indicating a great cosmetic advantage over simple enucleation.

Schmidt's method, which has already been described in the *Zeitschrift,* Bd. XVI, Erganzungsheft, p. 63, is briefly as follows: Balls, conforming in size to the glass spheres recommended by Mules, are turned from a block cut from the femur heads of oxen. These are then slowly calcined over a Bunsen burner, and are implanted in the scleral cup precisely as in Mules' classical procedure. The author finds that these balls are better tolerated by the tissues, and are not liable to be extruded. A similar method is practised by Schoute.

Barraquer, in 1901, was the first to implant fat in the orbit, but as his work was published in Spanish, it attracted little notice until Bartels, 1908, introduced the method into Germany.

Experimenting on rabbits, Marx eviscerated and filled the scleral cavity with fatty tissue. Subsequent histological examination showed new vessels penetrating the fatty tissue, associated with the formation of young connective-tissue. Eventually the fat cells disappeared, but fat and necrotic tissue remained for a long time in the cavity. In operating on human subjects, the scleral cup was tightly packed with fat, resulting in good immediate prosthesis.

Lauber has implanted fat in Tenon's capsule on thirty-seven occasions. The eye is removed in the usual manner; but, before the recti muscles are divided, a double armed suture is passed through them. A suitable piece of fat obtained by making an L-shaped incision in the abdominal parietes is placed in Tenon's capsule which is closed by catgut sutures.

The recti tendons are approximated, internus to externus, superior to inferior, and the conjunctiva is closed with interrupted silk sutures.

Alling ascribes the success of fat implantation to the fact that this tissue is "low-grade," and hence requires only a limited blood-supply to maintain its nutrition. This author and Ibershoff implanted a mass of fat about the size of a walnut in Tenon's capsule. The opposing recti were then sutured, and Tenon's capsule and conjunctiva stitched separately afterwards. The stump maintained its original size at the end of a year.

In Knapp's case the operation was done for cosmetic purposes only. A large piece of fat from the thigh was implanted in Tenon's capsule, and the conjunctiva sutured over it, no attempt being made to unite the recti muscles. The artificial eye was fully as prominent as the fellow-eye and had excellent motility.

Schirmer states that a fat implantation shrinks, but that the final result is much better than after an ordinary enucleation.

Terrien and others have had a considerable degree of success implanting the eye of a rabbit in Tenon's capsule according to Frost's method. Another suggestion is that of Haseltine, who implants a ball made out of catgut.

The various implantation methods outlined above uniformly provide a good bed for an artificial eye. Occasionally the cosmetic result is so perfect that it is difficult for the casual observer to tell which is the natural and which the artificial eye. Cases of sympathetic disease have been reported after these procedures, but in no case is it certain that the sympathetic trouble might not have arisen, even after a simple enucleation.

DIAGNOSTIC AND THERAPEUTIC NOTES.

THE DIAGNOSIS OF GOUT BY MEANS OF ATOPHAN.—Zuelzer (*Berl. klin. Wochenschr.*, No. 47, 1911). If a gouty patient is given atophan during the acute attack, his urine will contain a profuse sediment of almost pure uric acid, in the form of a grayish, cloudy turbidity. In rheumatic arthritis, on the other hand, no such excretion of uric acid takes place. Atophan is thus useful, not only therapeutically in gout, but as an aid in differential diagnosis.

COMPARATIVE TEMPERATURE MEASUREMENTS.—Stæubli (*Schweiz. Korresp. Bl.*, No. 32, 1911). Rectal temperatures are not always as trustworthy as they are usually considered to be. They can be used, for diagnostic purposes, only when the patient has been for some time absolutely quiet. In that case, they bear a definite relationship to mouth and axillary temperatures. After bodily exercise, the rectal temperature rises to 38°-38.5° C. (100.5°-101.5° F.), while the mouth and axillary temperatures remain normal. This may readily give rise to errors in diagnosis.

THE NOCTURNAL TREATMENT OF ACUTE GONORRHEA.—Kuhn (*Muench. med. Wochenschr.*, No. 37, 1911). Kuhn advocates a far more energetic treatment of gonorrhea than is ordinarily used. His patients are made to drink very great quantities of water or lemonade so that they urinate every hour or oftener. Each time, after urination, a weak solution of protargol or other organic silver salt is injected into the anterior urethras and held there several minutes. Thereupon the patient drinks as much water as possible; in any event, a greater quantity than that of the urine passed. This routine is gone through with, if possible, every half hour during the day and every hour during the night. When it can be carried out early in the disease, the gonorrhea is usually cured within the first week.

VACCINE DIAGNOSIS AND THERAPY IN GONORRHEAL AFFECTIONS.—Kœhler (*Wien klin. Wochenschr.*, No. 45, 1911). In his investigations, the writer used the preparation, arthrigon, a gonococcus vaccine made by the Schering Company. For diagnostic purposes he made cutaneous inoculations just as in the cutaneous tuberculin test for tuberculosis. In the presence of a gonorrheal infection, whether urethritis, arthritis or salpingitis, characteristic papules were produced at the cite of inoculation, lasting some eighteen to twenty-four hours. In non-gonorrheal

patients, a reaction was either entirely absent or, if present, was much more fugitive. He considers the test to have a moderate diagnostic value. Therapeutically, his results were less encouraging. The intramuscular injections of the vaccine were very painful, and often produced a local reaction at the site of the gonorrheal infection. In no case could a definitely beneficial effect upon the lesion be made out, so that he has discontinued the use of the vaccine.

The Diagnosis of Sudden Closure of the Coronary Arteries.—Hochhaus (*Deutsch. med. Wochenschr.*, No. 45, 1911). Sudden closure of the coronary arteries of the heart is not an uncommon cause of death in chronic cardiosclerosis. It usually occurs in individuals who have long suffered from attacks of angina pectoris, but the latter is not an invariable precursor of this mode of death. The complication may be diagnosed from the following symptom-complex: Angina pectoris of extremest intensity and duration accompanied by the signs of sudden and obstinately progressive cardiac weakness. At the autopsy, thrombosis of one or more coronary arteries is found in addition to sclerotic changes. In the absence of the latter, fairly extensive coronary thrombosis may exist without marked clinical manifestations, by reason of the establishment of a collateral circulation.

A Simplification of Schmidt's Test for Pancreatic Disease.—Kashiwado (*Deutsch. Archiv fuer klin. Med.*, Vol. 104, Nos. 5 and 6). The Practical Utilization of the Nuclear Test in Pancreatic Disease.—Schmidt (*Ibid.*). Schmidt's test, as is well known, depends upon the observation, that while protoplasm is well digested in the stomach, the nuclei are not acted upon by the gastric juice, being attacked only by the pancreatic juice. If a small cube of tissue, rich in nuclei, such as sweetbread is swallowed whole, it will be well digested by the normal individual. A patient suffering from pancreatic disease will, however, not digest the nuclei, and these may be recovered in the stool and will still take the ordinary nuclear stain. The practical difficulty of the test lies in the troublesome search for fragments of sweetbread in the stool. These fragments must be teased apart and stained, a procedure requiring time and patience. Kashiwado has modified the test so as to make it simple and easy. The sweetbread is digested with pepsin; the sediment, consisting only of the nuclei, is washed, stained with iron-hematoxylon and dried. The resulting dark-blue powder is mixed with lycopodium and placed in capsules containing 0.25 grm. (about gr. IV) each. The patient receives two of these capsules either with the midday or evening meal. The next stool is examined. As the lycopodium is absolutely indigestible and possesses a characteristic structure, it is readily found in the stool. Once it is found, the observer may be certain that the dark-blue nuclei must also be present, if the pancreas is seriously diseased. Kashiwado has shown, as a matter of fact, that in patients or in animals, in whom the pancreatic secretion has been seriously interfered with or its outflow into the bowel obstructed, there is no difficulty in finding these nuclei in stools containing the readily discoverable lycopodium spores. If the nuclei are not readily found, we may conclude that pan-

creatic digestion is active. The test thus becomes extremely simple requiring only a brief microscopical examination of the stool.

Schmidt, in a brief communication, endorses Kashiwado's modification of his method and recommends its routine use, where pancreatic disease is suspected.

The nuclear powder, stained and mixed with lycopodium and thus ready for immediate administration, has been put on the market by Merck, of Darmstadt, under the name "Stained Tissue Nuclei for Testing Pancreatic Secretion, according to Prof. Dr. Ad. Schmidt and Dr. Kashiwado."

———

·Venesection and Saline Infusion in Pruritus and Other Toxicodermias.—Simon (*Deutsch. med. Wochenschr.*, No. 48, 1911). Venesection has long been used in dermatology, but the combination of venesection with the intravenous infusion of physiological salt solution is a comparatively new mode of treatment for this class of cases. The procedure is simple. By means of venepuncture, 100-200 c.cm. of blood are withdrawn, and through the same canula 300-700 c.cm. of 0.9 per cent. sodium chloride solution are allowed to flow into the vein. If necessary, the procedure may be repeated from three to six times or oftener at intervals of five or six days. The writer has obtained the most strikingly favorable results in the various kinds of pruritus, often in cases that had obstinately resisted all other treatment. A striking case was that of a young man who, since early childhood, had suffered from a severe pruritus universalis. Of late, the itching had been so constant and violent as to make him an invalid. Nearly all conceivable therapeutic measures had been used without avail. After the first infusion, he was able to sleep all night, the first time in months. Two more infusions produced an apparent cure, so that he was able to return to work. Similar, if less spectacular, results were obtained in all cases of pruritus. The method was also satisfactory in urticaria, in chronic eczema, and in one case of furunculosis. In psoriasis the results were negative.

The rationale of the treatment is probably somewhat as follows: During the saline infusion, there is a considerable flow of fluid from the blood-vessels into the tissues; soon, however, this fluid again leaves the tissues, re-enters the blood-vessels and, with the production of a marked diuresis, leaves the system through the kidneys. There is thus produced a true tissue lavage which serves to explain the therapeutic effect produced. The latter is not directly dependent upon the amount of blood withdrawn or that of saline solution introduced.

BOOK REVIEWS.

ELECTRICITY. Its Medical and Surgical Applications. Including Radiotherapy and Phototherapy. By Charles S. Potts, M. D., Professor of Neurology, Medico-Chirurgical College; Formerly Instructor in Electrotherapeutics and Associate in Neurology, University of Pennsylvania Medical Department, Philadelphia. With a Section on Electrophysics, by Horace Clark Richards, Ph. D., Professor of Mathematical Physics in the University of Pennsylvania, and a Section on X-Rays, by Henry K. Pancoast, M. D., Professor of Roentgenology in the University of Pennsylvania, Medical Department, Philadelphia. With 356 illustrations and 6 plates. Philadelphia and New York: Lea and Febiger. 1911.

Most of the books upon electricity in medicine display an enthusiasm which is not reflected in the general medical mind. Therefore the conservatism of Pott's volume will be appreciated and honored. The volume is comprehensive, including as it does a discussion of all the recognized modalities of electrotherapy and electrodiagnosis with splendid chapters upon the *x*-ray by Pancoast.

The method of chapter division is unique as the plan provides for a medical rather than a physical subdivision of the subject-matter. Instead of each electrical modality being described in physiological, therapeutic and technical detail, the diseases of the nervous system, muscles and joints, blood-vessels, skin, etc., are taken up *serratim*, and the electrical applications in each are discussed with freedom and conservatism. Another feature of merit is that while there is ample information regarding apparatus, the volume is not overburdened thereby, and more space is devoted to the physiological principles of application.

The section upon Physics is by Horace Clark Richards, Ph. D., and the section upon X-Rays by Henry K. Pancoast, M. D., both of the University of Pennsylvania as is also the author, Charles S. Potts, M. D.

The volume will be valuable as a textbook for students, and is thoroughly reliable for reference purposes and instruction to the practitioner and specialist.

AN INTERNATIONAL SYSTEM OF OPHTHALMIC PRACTICE. Edited by Walter L. Pyle, A. M., M. D., Philadelphia. Member of the American Ophthalmic Society. PATHOLOGY AND BACTERIOLOGY. By E. Treacher Collins, F. R. C. S., Surgeon to the Royal London Ophthalmic Hosptal and Ophthalmic Surgeon to the Charing Cross Hospital, etc., and M. Stephen Mayou, F. R. C. S., Surgeon and Pathologist to the Central London Ophthalmic Hospital, etc. With three colored plates and two hundred and thirty-seven figures in the text. Philadelphia: P. Blakiston's Son and Co. 1911. Price, $4.00.

In textbooks dealing with diseases of the eye, the method usually adopted, that of treating separately the affections met with in each of its anatomical divisions, necessarily results in much overlapping. An inclusive description of ocular diseases can be given by dividing them into the several processes which occur in the life-history of the eye; and it is this method which Collins and Mayou have adopted. The first chapter deals with aberrations which occur in the eye in its process of evolution. The atavism of tissue (reassumption by mature tissue of embryonic characteristics) is discussed in the second chapter. Chapter III is devoted to the changes which result from the derangements in the circulation of the various fluids of the eye. Disturbance resulting from pernicious influences in the environment are discussed in Chapters IV, V, and VI. Chapter IV treats of injuries, V of the reaction of the tissues to irritation or inflammation, and VI, of various parasites which invade the eye and the specific reactions to which they give rise. The process of involution or degeneration is described in the last chapter. Both authors have enjoyed exceptional opportunities for the practical study of the pathology of the eye, and the results of their experience is here recorded. The book can be unreservedly recommended.

PAIN. Its Causation and Diagnostic Significance in Internal Diseases. By Dr. Rudolph Schmidt, Physician to the Royal Empress Elizabeth Hospital, Vienna. Translated and Edited from the Second Enlarged and Revised German Edition by Karl M. Vogel, M. D., Assistant Professor of Clinical Pathology, College of Physicians and Surgeons, Columbia University, etc., and Hans Zinsser, A. M., M. D., Professor of Bacteriology, Leland Stanford Jr. University. Second edition. Philadelphia and London: J. B. Lippincott Co. Price, $3.00.

In undertaking a systematic analysis of pain, Dr. Schmidt has performed a useful service. The great difficulties attending such an analysis hardly need to be emphasized to the general practitioner, who it so often called upon to interpret the subjective complaint in terms of the temperament and individuality of the patient. In fulfilling his task the author has throughout tempered his deductions from actual pathological processes with a careful critical consideration of the functional elements which, in the phenomena of pain, so frequently cloud the clinical picture.

In preparing the second enlarged edition of the book, Dr. Schmidt has performed the work of revision with more than ordinary thoroughness. Some of the chapters have been almost entirely rewritten, and in nearly every section more or less radical changes are to be found. The interest of the text has been greatly increased by the addition of numerous case-histories illustrating the discussions of the theoretical questions involved, and in many other ways the author has sought to make the work still better adapted to the needs of the practitioner and the student.

TRAITÉ CHIRURGICAL D'UROLOGIE. Par Félix Legueu, Professeur agrégé à la Faculté de Médicine de Paris, Chirurgien de l'Hopital Laënnec, Membre de la Société de Chirurgie de Paris. Préface de M. le Professeur Guyon, Membre de l'Institut. Avec 708 gravures dont 45 en couleurs hors texte. Paris: Felix Alcan, Editeur. 1910. Price, 40 fr.

This treatise by Legueu is a very comprehensive one. He has divided the book into three parts. The first part, containing fifteen chapters, is devoted to anesthetics, various instruments used in urological work, methods of preparation of the patient for the various procedures, such as explorations of the various parts of the genito-urinary apparatus; considerations of accidents during the various procedures; and a chapter upon the histo-bacteriological examination of the urine. The second part is devoted to symptoms of the various lesions of the genito-urinary apparatus, such as urine retention, incontinence, hematuria, chyluria, etc. The third part is divided into many chapters devoted to a very accurate consideration of infections of the various urinary organs and the treatment of the same. The last chapters consider thoroughly tumors, traumatisms, calculi, foreign bodies and deformities of the genito-urinary tract. The book is very complete throughout, devoting discussions to practically every phase of urological lesions. The author has also attached quite a complete statistical compilation to each chapter. The book is a splendid one and should be in the possession of everyone practising urology.

THÉRAPEUTIQUE USUELLE DE PRACTICIEN. Par Albert Robin, Professeur de Clinique Therapeutique à la Faculté de Médecine de Paris, Membre de L'Académie de Médecine. Paris: Vigot Frères. 1910. 2 Volumes, Price 8 fr. each.

Prof. Robin's treatise on practical therapeutics differs radically in plan from the books on this subject to which we are accustomed, at least in this country. He makes no attempt to cover the entire field of internal medicine, still less that of therapeutics. Certain diseases are selected, and a chapter or two are devoted to each. After discussing briefly the nature of the disease, he takes up its treatment, emphasizing as is natural his own views which often differ radically from those generally accepted. He then relates, in more or less detail, one or more cases that illustrate the points he has made. The whole conveys rather the impression of a series of informal lectures than of an exhaustive textbook. The charm and elegance of the presentation, the novelty of many of the views advanced, the combination of truly French lucidity with every evidence of careful observation and wide experience, make the book delightful reading. It is a pity that the mechanical make-up of the book is not in harmony with the value of its contents.

THE REFRACTIVE AND MOTOR MECHANISM OF THE EYE. By William Norwood Stouter, M. D., Associate Ophthalmologist, Episcopal Eye, Ear and Throat Hospital, Washington, D. C. With 148 illustrations. Philadelphia: Keystone Publishing Co. 1910.

Dr. Souter discusses his subject in four parts as follows: (1) Principles of Optics; (2) The Normal Eye; (3) Errors of Refraction; (4) Disorders of Motility; to which is added an appendix containing algebraic formulæ. In the absence of any prefatory explanation, we must assume that the author aimed to prepare a moderate-sized systematic treatise on the refraction and motor mechanism of the eye, intended primarily for the student who requires something more than the scant chapters devoted to these subjects in the average one volume textbook on ophthalmology, but who does not care to follow the intricacies of the subject as expounded in the more exhaustive treatises, such as Donders, Tscherning, and the like. The book is exceedingly well written and is adequately illustrated. The mathematical discussion is reduced to its simplest forms. The book can be unreservedly recommended.

SERUM DIAGNOSIS OF SYPHILIS AND THE BUTYRIC ACID TEST FOR SYPHILIS. By Hideyo Noguchi, M. D., M. Sc., Associate Member of the Rockefeller Institute for Medical Research, New York. 14 illustrations. Second edition. Philadelphia and London: J. B. Lippincott Co. Price, $2.50.

The value of the Noguchi test for syphilis has been the subject of much more or less acrimonious discussion. In brief, it is a simplification of the Wassermann test, so considerable as to render it suitable for any practitioner with ordinary training. Most experts in this work still consider the original method the only trustworthy one; there are however many investigators who maintain that Noguchi's modification represents an adequate substitute. Its true value must be considered to be still open to question.

In this second edition the most important section, that on the antigen, has been entirely rewritten and the recent improvements discovered by the writer embodied in it. The text is clear and concise and the illustrations illuminating. Anyone desiring detailed information and instruction in the performance of the simplified Wassermann cannot do better than to consult this book.

KOMPENDIUM DER ROENTGENDIAGNOSTIK, FUER STUDIERENDE UND AERZTE. Von Dr. Edgar Ruediger. Wuerzburg: Curt Kabitzsch (Stuber's Verlag). 1911. Price, 3 m.

Exactly what x-ray diagnosis can and cannot do is as yet not clearly understood by the bulk of the medical profession. It often happens that cases are sent to the roentgenologist that are not at all suitable for this method of examination; while in other cases, in which the x-rays are nearly indispensable for diagnosis, they are not made use of. This little book is not intended for the expert radiologist. The general practitioner will however find in it an excellent discussion of the conditions in which the x-rays are of diagnostic value and a clear description of the findings and of their interpretation. A series of excellent plates adds to the value of the book while the absence of an index is a serious detriment.

A MEDICAL HISTORY OF THE STATE OF INDIANA. By G. W. H. Kemper, M. D. Illustrated. Chicago: American Medical Association Press. 1911.

The medical profession of Indiana is to be congratulated on having had its achievements chronicled by so thorough an historian as Dr. Kemper. In a well-written and neatly-printed volume of 393 pages we find many interesting facts concerning the physicians, the medical colleges, the medical journals and the medical societies of Indiana. The story of the first cholecystotomy performed by Dr. J. S. Bobbs, June 15th, 1867, is worthy of mention.

WALSH'S PHYSICIANS' COMBINED CALL-BOOK, TABLET AND DOSE-BOOK. Washington, D. C.: Ralph Walsh, M. D. Price, $1.50.

WALSH'S PHYSICIANS' HANDY LEDGER. A Companion to Walsh's Physicians' Combined Call-Book and Tablet. Washington, D. C.: Ralph Walsh, M. D. Price, $3.50.

The HANDY LEDGER used in combination with the CALL-BOOK, which is virtually a day-book, makes a simple, labor-saving system of medical bookkeeping.

BOOKS RECEIVED

Knoll's Pharmaka. Ludwigshafen a. Rhein: Knoll & Co. 1911.

Queer Patients. By M. Oston, M. D. Edinburgh: John Currie. Price, 3 s. 6 d.

Biological Aspects of Human Problems. By Christian A. Herter. New York: The Macmillan Company. 1911. Price, $1.50.

The Practitioners' Visiting List. 1912. Thirty Patients per Week. Philadelphia and New York: Lea and Febiger. Price, $1.25.

The Medical Record Visiting List or Physicians' Diary for 1912. New Revised Edition. New York: William Wood & Co. Price, $1.50 and up.

Treatment of Neurasthenia by Teaching of Brain Control. By Roger Vittoz. Translated by H. B. Brooke. New York: Longmans, Green & Co. 1911.

The Triumph of American Medicine in the Construction of the Panama Canal. By J. Ewing Mears, M. D., LL. D. Philadelphia: Wm. J. Dornan. 1911.

The Physician's Visiting List. By (Lindsay & Blackiston's). For 1912. Sixty-first Year of Its Publication. Philadelphia: P. Blakiston's Son & Co. 1911.

Exploration Manuelle de L'Estomac et en Particulier sa Palpation Directe et Profonde. By L. Pron. Librairie Médicale et Scientifique. Paris: Jules Rousset. 1912. Price, 2 fr. 50.

Die Fleischlose Kueche. Eine theoretische Einleitung und ein praktisches Kochbuch von Dr. med. Julian Marcuse und Bernardine Woerner. Munich: Verlag von Ernst Reinhardt. Price, 3 m.

Die Bedeutung der Konstitution fuer die Saeuglingsernaehrung. Von Dr. Max Klotz, Assistent der Universitaetskinderklinik zu Strassburg i. Els. Wuerzburg: Curt Kabitzsch. 1911. Price, 85 Pfg.

Meine Praeparations Methode des Operations Feldes Mittels Jodtinktur. Kgl. Rat. Dr. Antonio Grossich, Primarchirurg am Ospedale civico in Fiume. Berlin: Urban and Schwartzenberg (Rebman Company, New York). 1911. Price, 75 cents.

Evolution Darwinian and Spencerian. The Herbert Spencer Lecture Delivered at the Museum, December 8th, 1910. By Raphael Meldola, F. R. S. Oxford: At the Clarendon Press (Oxford University Press, New York). 1910. Price, 1 s. 6 d.

Ueber moderne Syphilistherapie mit besonderer Beruecksichtigung des Salvarsans. Von Geh. Med.-Rat Prof. Dr. A. Neisser, Dir. der Dermatolog. Univ.-Klinik und Poliklinik in Breslau. Halle a. S.: Carl Marhold Verlagsbuchhandlung.

Herbert Spencer and Animal Evolution. The Herbert Spencer Lecture Delivered at the Museum on December 2nd, 1909. By Gilbert Charles Bourne. Oxford: At The Clarendon Press (Oxford University Press, New York). 1910. Price, 1 s. 6 d.

Case Histories in Medicine. Illustrating the Diagnosis, Prognosis and Treatment of Disease. By Richard C. Cabot, M. D., Assistant Professor of Clinical Medicine, Harvard Medical School. Second Edition, Revised and Enlarged. Boston: W. M. Leonard. 1911. Price, $3.00.

Anaesthesia and Analgesia. By J. D. Mortimer, M. B. (Lond.), F. R. C. S. (Eng.) Anaesthetist, Royal Waterloo Hospital; Throat Hospital Golden Square; St. Peter's Hospital for Stone, etc.; Instructor, Medical Graduates' College. New York: Oxford University Press. 1911. Price, $2.00.

EDITORIAL.

THE MAXIMUM OF ENERGY.

The opinion which prevails among all American people, be they of the medical profession, or any other profession, or mere laymen whose daily routine of business prevents them from deeper thinking than how to make both ends meet, is that as a people we of these United States are living continually in what, for want of a better term, might be called a state of "over-energization." So strong is this belief, that we have not hesitated to make of it a cult whereby to impress all foreigners so that this phase of our Americanism may not only confront them as a defiance to their possible criticism, but make plain to them the reason of our ever growing prosperity. Now, though this opinion has been safely ensconced with us for many years, and has really become the hall-mark which has moved us to our most pretentious vainglory, this fact alone does not prove its unassailable correctness; for, if we are to believe the late Professor William James,* "the human individual thus lives far within his limits; he possesses powers of various sorts which he habitually fails to use. He energizes below his *maximum,* and he behaves below his *optimum.*" Hence ought we to continue to boast of the inroads into our health on account of our energizing as no other nation has ever attempted to do?

Aside from what physicians may have observed in exceptional circumstances, that is, in those tens among thousands of patients in which there were indubitable indications that the neurasthenic and psychasthenic conditions were due to "over-energization," is it not also true that the "habit-neurosis," to use William James's expression, plays an active part in bringing about these deplorable phases in the down-grade of our

---

*Memories and Studies—The Energies of Men. By William James. (Longmans, Green and Co., New York, 1911.)

nerves? For by "habit-neurosis" is meant a state of nerves brought on by what you and I and our neighbors are daily and unwittingly doing—performing our routine tasks in a more mechanical way the oftener they are repeated until we realize "the wider potential range and the habitually narrow actual use." And, even in those cases which physicians have repeatedly cited to show the evil effects of "over-energization," would not the physician, were he a better philosopher than physician, realize that the energizing was done in too many and in such wrong directions that the mental and physical forces were eaten up, so to speak, by a hydra-headed monster instead of by "over-energization" in the special line of work for which nature had wisely fitted these beings? Does the average American citizen, who cannot help being bitten with the social disease—ambition (he would be a sorry wight, in his friends' opinions, were he proof against it), and who devotes his time to so many and diverse affairs that he may chameleon-like change from the lowly position of yesterday to the lofty one of to-day, become, in the course of a few months or few years, a neurasthenic and psychasthenic, or are we "making use of only a small part of our possible mental and physical resources . . . being cut off from our rightful resources [and then passing into] the formidable neurasthenic and psychasthenic conditions, with life grown into one tissue of impossibilities, that so many medical books describe"? In short, should we as physicians believe with William James that our thousands of compatriots, who for years have triumphantly carried the banner upon which is written in large, flamboyant letters their special brand of energization, are in truth energizing below their *maximum* and behaving below their *optimum?*

As sociologists, and not as physicians, we know that what William James wrote on this subject is not only true, but betrays the sort of philosophizing mind that alas! is only too often absent from the mental workings of the average physician. Which one of us, taking for granted that we have been keenly observant and thoughtful, has not met with the ambitious individual of small mental calibre, who wishes and persists in overriding all obstacles in his headlong pursuit of power, of money, of fame, if it can be grabbed by hook or by crook, but who all along is under-energizing in his special work, so great is his desire to do something more important than what Nature intended him for. And on the other hand, is the other type less frequent—the man, or the woman for that matter, who from an unchanging way of thinking gets into "the habit of inferiority to [his or her] full self." Both types are wrong and lead to the same conditions—neurasthenia and psychasthenia, since in both instances we have a dissipation of forces that cannot but act as the true ballast in the shaping of real men and women.

Of all countries the United States undoubtedly holds the palm for thrusting upon its citizens an artificiality in the matter of what really should constitute one's manner of living, or rather in what direction an ambition should lie to conform with the autocratic dictates of Nature. On the one hand, our provincialism, descended to us from the Puritans, has prevented many a life from exercising its functions to its fulness, while, on the other, the minority, or is it the majority, who have rebelled, have pursued so erratic an existence, in their many hot pursuits after this or that guerdon, that their real work has been sadly neglected. And, when we think deeply on this subject, perhaps William James was not in the wrong when he advocated "there is no doubt that to some men sprees and excesses of almost any kind are medicinal, temporarily at any rate, in spite of what moralists and doctors say"; a tenet which, if followed to the letter, might perhaps restore the equilibrium in an individual whose artificial manner of living has caused the worst form of disequilibrium.

DANGERS IN THE USE OF WATER AND SALT SOLUTIONS.

The development of our ideas concerning the use and abuse of saline solutions has developed many interesting phases. Not many years ago it was considered impossible that harm might result from the common use of subcutaneous injections of water containing a small amount of salt, but at the present time real dangers are known to lurk in this simple procedure. The first intimation of wrong came with the discovery that sodium chloride solution had a pyrogenic action, and that when given to man or to rabbits it was capable of causing a rise of several degrees in the body temperature. It was shown, in most of the earlier experiments, that the reaction varied with the age of the patient or animal in that the nearer birth the injection is made the greater will be the reaction. This work was accepted very generally, and no one attempted any other explanation of the phenomenon than that it was due to the sodium chloride molecule. Naturally it was extremely rare to inject simple water into patients, and it was very easy to demonstrate the rise of temperature following saline injections, especially in children. Just at the time of these observations interest was being centred in the metabolism of mineral salts, so *post hoc, propter hoc* the reaction was due to the salt.

A short time later an American scientist made the remarkable claim that in practically all cases of tuberculosis he was able to demonstrate the presence of tubercle bacilli in the circulating blood. Such an epoch-making discovery started many researches to test the truth of his state-

ments, with results widely divergent. Many persons who could not be persuaded of the scientific accuracy of the work, nevertheless could not prove the error until Brem studied the possibility of there being acid-fast bacilli in the water used. It was indeed a surprise to learn that distilled water might contain bacilli morphologically indistinguishable from tubercle bacilli, yet Brem's observations seem to have proved their existence. As far as our recollection goes this was the first important communication showing that distilled water might not be entirely innocuous, but in view of the interest of the medical world in the other side of the question, the possible further evil effects of plain water were forgotten.

Next in the development of the story of possible harm in water and salt injection comes the epoch of salvarsan. From the very first it became known that in some places the injections were painless, and without any sequelæ; whereas, in other places, with apparently the same technique, the injections were followed by pain, rise in temperature, nausea, vomiting, malaise, and occasionally even more severe symptoms. As usual, deductions as to the cause took the path of least resistance; first the drug itself was not quite the same, then the reaction of the final solution might vary; and yet with these problems settled, the possibility of some harmful effects could not entirely be eliminated. The fact that fever followed salvarsan was not correlated with the known fact that fever followed saline injections; and only as the result of an accidental occurrence in Wechselmann's clinic was the truth finally known. Wechselmann noticed that in one of his wards salvarsan injections were followed by certain disagreeable results, while in another ward his patients were free from any untoward symptoms whatever. Further investigation showed that the only tangible difference in the technique lay in the water used; in the ward where no complications followed the injections, the water had been sterilized more recently than in the other ward. Considering then that the water might be the cause of the evil after-effects of salvarsan injections, he began to use only water sterilized just before use; and immediately his patients failed to show the after-effects of salvarsan. Wechselmann attempts to explain these results by the presence of saprophytic bacteria in distilled water which has stood. Such bacteria will, to a certain extent, be soluble; at least proteid matter will pass from them to the water and will not be held back by the filter. The longer the water stands, the more proteid matter will pass from the bacteria to the water; and, as is well known, the products of proteid digestion when injected into the body may produce many symptoms.

But whether Wechselmann's theory be correct or not, his practical conclusions have been completely verified by Swift and Ellis, who also

studied the effect of the water in salvarsan injections. In 53 cases treated with salvarsan, made up in old distilled water, there were 48 reactions. In 56 injections with freshly distilled water there was complete absence of nausea, vomiting, pains of any sort; while in only 11 was there any rise of temperature, and in each of these cases the reaction could be explained. In some the water was not fresh, in others the saline had been previously opened. Swift and Ellis show conclusively that the harmful effects of salvarsan occur in inverse arithmetical progression to the number of days that the salt or water, used in making up the solution, has been allowed to stand.

Quite independently of the German and American studies on salvarsan, Hort and Penfold in England arrived at the same result in a somewhat different manner. They worked with pure salt solutions and arrived at the conclusion that the so-called harmful effects of saline were due entirely to the water used, and that distilled water, especially in large amounts, was far from harmless. The harmful effects occurred only after using water which had been allowed to stand. They attempted to remove this harmful factor by various means such as centrifugalization, filtration and boiling, but without any success; and they believe that the only proper method of doing away with the dangerous element is by distillation in a Jena flask just before use. Although Hort and Penfold offer no explanation for the facts which they proved, their experiments show definitely that the harm is done by something in solution in the water. As this material is not present when the water is first distilled, it is only reasonable to assume that it results from the growth of some vegetable or animal saprophyte; and in this connection it should again be stated that Brem found his acid-fast bacilli only in water which had been standing. It is a fact well known to all who have had to do with the keeping of "stock" saline solutions, that no matter how sterile the solution may have been when first prepared, it may upon standing develop a heavy growth of fungus; and it does not require any great exertion of the scientific imagination to conceive of the presence in minute amounts of some similar growth in the freshly prepared solution. Water will extract protein matter from such material; and the soluble products of protein metabolism are certainly toxic to the animal body. Wechselmann's theory then of the causes of the after-effects of salvarsan seem to us justified by what is known of the actual condition of affairs. But whether the theory be true or not, certainly one new fact stands out prominently: water should never be injected into the human body unless it has been freshly distilled in glass.

THE SOCIAL VALUE OF MEDICINE.

The sociologic value of the science and art of medicine are both receiving much attention of late and it is good augury for the future. Laymen do not seem to realize what profound changes in civilization have resulted from scientific medical discoveries since the middle of the nineteenth century. The practical application of these discoveries has made it possible for swarms of people to live in health and comfort where formerly death was the penalty of invasion. Modern cities would melt away in six months were we suddenly to deprive them of modern sanitation. Indeed, the whole framework of modern life is built up of sanitation, and it is now also recognized that in the case of the sick, the profession has a duty which is semi-public, even if it is primarily a personal service to the patient, for we are constantly preserving lives society can ill spare. Professor C. R. Bardeen made this social value of medicine the subject of his commencement address at Rush College (*Science*. October 20th, 1911) ; and it is to be hoped that sociologists and economists the world over will take up the crusade started by Prof. Fisher and his colleagues of Yale University for the conservation of life and health—the best of our national resources. There have been mistakes made in this movement and there will be more, but minor errors should not permit us to be lukewarm towards a great movement for the betterment of society on medical lines.

Farmers often know more about raising pigs than babies, and we spend immense sums to teach them how to feed their hogs, but not a word as to how to feed their boys. This public callousness as to human life is slowly melting ; we find that public opinion is now tolerating some invaluable food investigations by governmental scientists, and we expect to see a time when it will demand them. But that time will not come unless we have many more such addresses as Bardeen's—and delivered to laymen too. The latter are the ones who make public opinion, and they should demand that all diseases be cleared up by organized effort instead of by the haphazard work of self-sacrificing private investigators. This is not paternalism,—the *bête noire* of so many who fear oppression and even complete loss of personal liberty, but merely a common-sense proposition to keep alive as long as life is worth living. What we most want—health—is the least considered by governmental agencies.

The increasing demand for a governmental department devoted to all public health matters should soon be strong enough to show results, but there will be no action taken until the voters are overwhelmingly in its favor. It is the time for talk.

OPINION AND CRITICISM.

MEASLES IN MONKEYS.

With so many accomplishments of medical sciences occurring almost daily, it is surprising how little has been done with the exanthematous diseases. Chicken-pox, scarlet fever, measles, are still as mysterious as ever—the cause, the method of transmission, the cure, are unknown; whereas, even in those diseases which baffle the investigator to explain fully, at least the cause is known. Scarlet fever and the associated streptococcus certainly are not related as effect and cause; chicken-pox is a mystery, and until quite recently measles belonged to the same class. It is true that no successful transference of measles had been accomplished, unless one considers an occasional case found in a monkey that had been around humans with measles. But within the past year measles has been successfully transferred to several species of monkey; and, knowing how the path of complete knowledge is built of small stones, we wish to emphasize and review the work.

As has been the case with very many recent discoveries, the pioneer work has been done by Americans; and it is a combined source of scientific regret and pride to note in the newer investigation of Nicolle and Conseil, that, while following those of Goldberger and Anderson, it adds nothing new to the American discovery. Goldberger and Anderson showed in the summer of 1911 that it was possible to inoculate monkeys (*macacus rhesus* and *m. cynomolgus*) with a disease clinically like measles by injecting defibrinated blood from a human case just before the eruption or within twenty-four hours of its first appearance. In monkeys, so inoculated, an incubation period of not less than five days ensues, followed by rise in temperature, and often by symptoms referable to the respiratory system, such as sneezing or coughing. A characteristic eruption appears in most cases. Furthermore, the disease so produced is capable of transmission through several generations by means of inoculation of defibrinated blood.

Later Goldberger and Anderson devoted their attention to determining the mode of transmission of the virus; and their first experiment showed definitely that a monkey could become infected with measles by direct contact in the cage with other infected monkeys. Of course, the word "contact" is not very significant, and does not lead far in the elucidation of the exact path of the contagion. In a disease characterized by such violent involvement of the nasal, buccal and pharyngeal mucous membrane, one would expect that, in the early stages at least, the secretions of these membranes would contain the virus; and the experiments of Goldberger and Anderson proved this point.

Now Nicolle and Conseil have added to our fund of knowledge merely that another species of monkey is susceptible to the disease; and from their report one cannot feel absolutely certain of that. They inoculated a Chinese bonnet monkey (*macacus sinicus*) with the blood of a child, ill with fever, prostration, conjunctivitis and coryza, but without eruption. The last appeared twenty-four hours after the withdrawal of the blood, and the monkey became sick on the ninth day with fever and prostration, but without any of the usual characteristics of measles.

In reviewing these studies on measles we wish to correlate them with the now well-known investigations on epidemic cerebrospinal meningitis and infantile paralysis. In meningitis, owing to the knowledge of the infective agent, the line of work was along somewhat different lines, and from the earlier results it would have been rash to prophesy the wonderful cure that finally resulted through the efforts of Flexner and Jobling. But one parallel line with the work on measles is seen in the demonstration that the disease could be conveyed through the nasal mucosa. The researches on infantile paralysis started along the same lines as the present studies of measles: in both the cause is unknown, the disease is transmitted to monkeys, the virus is found in the nasal and buccal mucous membranes. Whether the further work on measles will clear up the nature of the infective agent remains to be seen, and where the studies will finally lead, no one can predict. If art is long and time is fleeting, science has the longest, slowest but surest path.

LITERARY NOTES.

The note which Dr. C. W. Saleeby sounds in his latest book, "Surgery and Society" (Moffat, Yard and Company, New York), is a very clear one, since it is not only a tribute to Listerism, but an emphasis on the fact that, on account of the aseptic advances made in surgery, society should know exactly what it owes to this branch of science. That society has been ungrateful in the past is not for the writer of these lines to say, as he has never taken upon himself the task of sounding its various members as to what they thought on the subject; but, from what he has observed in a casual manner, the conclusion must be admitted that among the laity the late Lord Lister's name is not as well known as Tennyson's, or those of lesser Englishmen for that matter. Of course, to expect English-speaking countries to revere a man of scientific attainments with the ardor that is bestowed on their favorite poets and novelists is really asking too much in the way of appreciation, for being a stodgy and practical people we needs must turn to something that smacks of romance when a household god is desired; an attitude that is in contradistinction to the French who, with all their faults born of a romanticism that often outrages our much-developed common sense, regard

science in an altogether different light, as was illustrated some years ago when a plebiscite was taken as to who were the ten greatest Frenchmen of the nineteenth century, and Pasteur received the largest number of votes. Now if the author of "Surgery and Society" had in mind, when he penned his book, the thought of our habitual remissness in the matter of gratitude to men of science, his glowing words in the chapter on Surgery As It Is can be accounted for, and, for that matter, the many tributes paid this branch of science in all the other chapters: tributes couched in such plain terms that he who runs may read, and hence of real value to the many who are not given to the reading of medical subjects. While this book must perforce be classed with the popular brand, so obnoxious to the conservative physician, it is head and shoulders above its compeers in that it is written with no eye to sensationalism and with considerable literary grace. But whether or not we approve of teaching the public the innermost secrets (?) of any one branch of medicine, the fact remains that if more books of this sort were written in the same spirit of fervor tempered by judgment and preciseness of presentation, the time might come, even in English-speaking countries, when a popular vote as to who were the ten greatest Englishmen of the nineteenth century would result in a few votes for Lord Lister.

———

In a very pleasing biography, "Sir John Burdon Sanderson: A Memoir" by the late Lady Burdon Sanderson, Completed and Edited by his Nephew and Niece (At The Clarendon, Oxford; Oxford University Press, New York), we read: "Soon after receiving the degree of Doctor of Medicine, Burdon Sanderson proceeded to Paris, whither he was preceded or accompanied by several of his fellow students who desired, as he did, to advance their medical studies. The advantages offered by the Collège de France and the large hospitals of Paris were much better known in England at that time [1851] than any facilities which Germany might have offered, and the means of communication were much easier. The French capital was frequented more numerously by English students than were any of the German Universities." This quotation, so pertinent of the times, is given here just to show that some sixty years ago the young physician, who went to a foreign country to complete his studies, selected Paris in preference to other cities; a fact that might be remembered by some of our compatriots with profit when their own Teutonomania becomes too excessive to be reckoned among man's lovable qualities. But other times, other manners, so when young Burdon Sanderson left with his degree from the University of Edinburgh, he "began to work at organic chemistry with Gerhardt, but shortly after transferred himself to the laboratory of Wurtz [where] he devoted himself to the study of the organic compounds which are found in animal tissues, [and] in the beginning of 1852 he was attending lectures on embryology by Coste and

on physiology by Claude Bernard." Thus the reader may see at once that this ambitious young man fared pretty well as regards scientific training, and really found in Paris what he had come for! That the promise, which he evinced early in life, of becoming some day a man of science, an outstanding figure in the scientific world, was fulfilled, everyone, who has followed the progressive steps of physiology in the nineteenth century, knows; but what he does not know is the real character of the man, his strivings and frustrations, his mental powers in the face of defeat, and the final fruition that came to him when he was appointed Waynflete Professor of Physiology in the University of Oxford, though in the beginning his life there was anything but pleasant, what with wranglings on the subjects of expending "a sum not exceeding £10,000 in the erection of a Laboratory, Working Rooms, and Lecture Room for the Waynflete Professor of Physiology, and in providing fixtures, warming apparatus, and gas for the same" and "that without further order of the University, buildings and appliances provided by the University be not used for the performance or exhibition of experiments involving pain to animals, or of any operation on domestic animals." But despite these stormy first days Burdon Sanderson held his own, and, so well, that during the twenty-three years spent at Oxford, not only was the course of his existence one of even tenor, but he became "one of its best-known figures." Everyone interested in the growth of our knowledge of physiology and in one who was an unrelenting advocate of practical experimental work in the laboratory should not fail to read this record of an exceptional student and an earnest and sincere worker on behalf of science.

———

While "Famous Chemists" by E. Roberts, B. Sc. Lond. (George Allen and Co., London) is not a work that would be classed by laboratory workers among the books which are indispensable in their libraries, it nevertheless has the good points which go to the making of a book that may be read with pleasure and profit by those who are content with a rather superficial view of the subject. The word "those" is used by us in no contemptuous manner, since it is our firm conviction that the majority of readers may be classed under this term; and by majority is meant, in this instance, a goodly number who read books worth reading so that some knowledge will be theirs when subjects, foreign to their daily routine in the matter of reading, are under discussion. But even the student, who spends his days in the laboratory, may find something in this little book that will interest him—that is if he cares for the human note in writings—and feel grateful to one who has described a group of scientists succinctly and with an absence of dryasdust pedantry.

ORIGINAL ARTICLES.

POINTS IN THE DIAGNOSIS AND NON-SURGICAL TREATMENT OF DUODENAL ULCER.

By George Herschell, M. D., of London.

It is now very generally admitted, even by those who take a conservative view, that some, in fact we may say the majority, of the cases which we have been accustomed to diagnose as functional troubles of digestion have an anatomical origin. And in view of the undoubted fact that in many cases biliousness, gastralgia, indigestion and stomach-ache, with nausea, vomiting, eructations or flatulence, are in reality due to an unsuspected gastric or duodenal ulcer, chronic pancreatitis or cholecystitis, inflamed appendix, or to adhesions between the gall-bladder, stomach, duodenum or colon, the ordinary general textbooks of medicine will have to be largely rewritten.

As a general rule it may be stated that the symptoms of duodenal ulcer are those which were formerly at first called acid dyspepsia and more recently hyperchlorhydria. The writer thinks, however, that we are not justified in the assertion recently made by Moynihan, of Leeds, in a monograph upon duodenal ulcer that *"persistent* hyperchlorhydria . . . is the medical term for the surgical condition, duodenal ulcer." We undoubtedly find symptoms, which in practice cannot be distinguished from those of duodenal ulcer, in chronic gall-stone disease, and in chronic appendicitis; and there are most certainly both a condition of hyperchlorhydria due to a proliferative gastritis and also one which is a purely nervous condition. Nevertheless, the fact remains, and this is as far as the writer thinks we are justified in going, that there is a group of different affections comprising those enumerated above which are characterised by the symptom-complex to which stomach specialists for the last ten years have given the name of hyperchlorhydria, and that of these, duodenal ulcer is by far the commonest. We may further add that probably the majority of the cases, described in medical literature as Reichmann's disease, were duodenal ulcer. In fact, anyone, who will read Reichmann's classical treatise in the light of our present knowledge, will at once recognize the fact that the cases he so graphically narrates, and upon which he based his theories of permanent hypersecretion, were most of them almost certainly ulcer, either of the duodenum or of the pyloric

part of the stomach. And as, on the one hand, the writer cannot agree with Moynihan, so on the other, he must join issue with Hutchison* who says that "unless a large hemorrhage from the bowels has occurred the diagnosis of duodenal ulcer can never be a matter of certainty."

An opinion that duodenal ulcer is present, obtained by the means which modern science places at our disposal, should be as certain as any diagnosis of any disease which is made by deduction from clinical data and not from actual inspection of a lesion.

TYPICAL HISTORY.

In the diagnosis of duodenal ulcer we cannot attach too much importance to a typical history. In most cases it will be found that the patient has for a considerable time, frequently for many years, suffered from successive attacks which, although varying in severity, present the same general characters. Whilst at first, in the intervals between the attacks, the patient has been in good health and has considered his digestion to be normal, latterly the periods of suffering have been more frequent and there have been dyspeptic troubles between them.

The attacks usually come on in the spring and autumn and are often attributed by the patient to catching cold.

The intervals between the attacks, in all probability, correspond to partial or complete temporary healing of the ulcer brought about by change of air, open-air exercise, residence at the seaside, or any other change in habits tending to improve the general health. The good effect of change of air and rest often leads to the erroneous supposition that the affection from which the patient is suffering is nervous dyspepsia or gastric neurasthenia.

The explanation of the temporary cure of the ulcer is probably that in the early stage of the complaint the deficiency of antilytic bodies in the blood is yet slight and may be restored by anything calculated to improve the general health. Conversely, it is quite easy to understand how exposure to cold or other depressing influence may, in a predisposed subject, lead to the deterioration of the blood which renders the existence of a duodenal ulcer possible.

As regards the apparent causation of an attack, from an analysis of the writer's cases, it appears that after a period of apparent health an attack has usually followed exposure to chill or cold winds, overfatigue, mental worry, a large indigestible meal, or indulgence in alcohol, sour wines, or acid drinks. In several cases the attack followed the use of pickles and condiments.

Pain.—This may vary in character and degree between very wide limits. In many cases, especially in the early part of the history, there may merely be a feeling of discomfort or distension. In other instances,

---

Clin. Journ., October 17th, 1906.

it may be of burning or gnawing character, being occasionally severe and cramp-like or resembling colic. It is a characteristic of the severer pain that it is often accompanied by a feeling of distension.

The time relation to food may vary in individual cases, the pain usually coming on about two hours after a meal. The period is shortened by liquid food, by recent adhesions or by commencing pyloric stenosis (Moynihan). The period may be lengthened by food of an extra solid nature or in cases in which the ulcer is adherent posteriorly (Moynihan).

The position of the pain is usually in the epigastrium to the right of the middle line, and in advanced cases may radiate through to the back or toward the right shoulder, being reflected through the third and fourth dorsal nerves.

The pain is relieved by taking food, or alcohol, and by the administration of alkalies or, in some cases, by the eructation of acid or bitter liquid, but it often persists after vomiting.

Two important characteristics of the pain then are its crescendo character, being accompanied, at its height, by a feeling of fullness and distension, and the constancy of its time-relation to food. It invariably occurs earlier with liquid than with solid food; at first only after the heaviest meal of the day, later after the other ones as well. The character and intensity of the pain vary in different patients, such variability being due to different mechanism of causation. We may have crampy pains due to real spasm of pylorus, or more constant discomfort accompanying the passage of acid fluid from the stomach into the duodenum. It is well known that fluid commences to leave the stomach shortly after it has been taken, but at first all the acid is in a state of combination. We know that it commences to be free after half an hour or so. But the pain does not come on until later. It is then probably due to the acrid nature of the products of digestion mixed with free HCl. This accounts for the fact that the characteristic pain is experienced in cases in which chemical analysis of the stomach-contents shows diminution of the free HCl. There is, of course, as an important factor, the zone of hyperesthesia in the duodenum due to the ulcer.

Patients with duodenal ulcer are especially prone to suffer from a pain for some little time before meals, which is promptly relieved by food. This is the so-called "hunger pain" and is a valuable but not diagnostic sign. It depends upon several factors:—

(a) It may be caused by traction upon the tender or adherent duodenum as the pylorus moves to the left during the emptying of the stomach.

(b) It may be due to the presence of continual secretion of gastric juice after the stomach has emptied itself. (Permanent Hypersecretion of Reichmann.)

(c) It may be a neurosis and not to be distinguished from the hunger pain so frequently met with in gastric neurasthenia.

Pyrosis or Heartburn.—This is often met with in cases of duodenal ulcer, but is, by itself, of no diagnostic value. It simply denotes that there is spasmodic closure of the pylorus, which prevents the stomach from emptying itself by the proper channel. The spasmodic efforts of the stomach to overcome the obstacle cause some regurgitation of fluid into the lower esophagus, which gives rise to a sensation of burning, especially marked when there is hyperesthesia of the lower end of the esophagus.

Flatulence.—In a certain number of cases practically the only subjective sign of duodenal ulcer is flatulence coming on after meals and especially at night. The following is a description of a case which was under the writer's observation for a long time. The patient complained chiefly of flatulence which sometimes came on before a meal and was relieved by food. The worst attacks came on at night shortly after retiring to rest and produced the greatest distress, there being apparently a spasmodic closure of the cardiac and pyloric orifices, which prevented the wind from escaping from the stomach. The distension, when extreme, produced a sensation of suffocation, and the patient felt as if every breath would be his last. There was also a feeling of constriction at the throat, possibly due to vagus irritation. When the distress was at its worst, the patient would bring up some wind and the attack would subside. Usually the attack lasted until about 3 a. m. when the spasm relaxed, the stomach emptied itself into the duodenum, and the patient went to sleep.

These attacks are best relieved by menthol and valerian, an eligible preparation being validol.

At the operation on the aforementioned case, a small, hard ulcer was found posteriorly in the duodenum about an inch from the pyloric orifice. A complete recovery followed a gastro-enterostomy.

Salivation is occasionally observed in duodenal ulcer as a reflex phenomenon, and when present should be regarded as strongly suggestive of the disease. The writer has observed it in 3 cases in which the presence of the ulcer was subsequently verified by operation. In one of these cases it happened very often that at the commencement of an attack of pain the mouth would suddenly fill with saliva.

Hemorrhage.—When present this is a valuable sign. The history of a past melena would enable us to dispense with some of the characteristic symptoms and yet justify us in diagnosing the affection. Many cases, however, only show occult blood in the stools, and in some there is never any trace of blood to be discovered. It is probable, however, that in practically all cases there is bleeding at some time or another, the reason why it is not discovered being because (a) it may be very small in amount and a delicate enough test may not have been used; (b) bleeding from non-malignant ulcers of the intestines is only occasional and not constant, and it may happen to have been absent on the occasions upon which we were looking for it. The writer has found it much more frequently since he adopted the plan of making the nurse test the stool

daily, as a matter of routine, with the benzidin test. We may thus say that the absence of blood in the stools does not exclude duodenal ulcer, but its presence is strongly suggestive.

Whilst a considerable hemorrhage as shown by melena is a serious complication calling for immediate operation, and occurs so late in the history as to be unavailable for early diagnosis, the occurrence of small hemorrhages which require chemical analysis of the feces for their recognition is of much greater frequency, occurs early enough in the evolution of the disease to be of importance from a diagnostic standpoint, and should always be looked for. The presence of occult blood in the feces denotes some bleeding in the alimentary tract; and certain sources of fallacy taken into consideration, if constantly present it strongly points to malignant disease; if occasionally present suggests non-malignant ulceration of stomach or intestines. Its presence is thus of importance as negativing the idea that the symptoms from which the patient suffers are of functional origin or depend upon the reflex irritation of gall-stones or appendicitis.

Cirrhosis of the liver is one of the most frequent causes of error in the interpretation of occult blood in the stools, as it often exists without any symptoms of gastro-intestinal disorder or with very indistinctive ones.

Dilatation of the Stomach.—A certain degree of dilatation of the stomach is often met with in cases of duodenal ulcer and may be the result of repeated pyloric spasm, excited by the hyperchlorhydria which so frequently accompanies the affection or of stenosis of the duodenum from cicatrization of a previous ulcer.

Rigidity of the Right Rectus Muscle.—In the majority of cases the right rectus muscle presents, on examination by palpation, a distinct rigidity as compared with the left one. In some cases it is thrown into reflex spasmodic contraction on any attempt at palpation. In cases of long standing it is frequently hypertrophied from often repeated spasmodic contraction.

Tenderness.—Tenderness, and especially deep tenderness, is a very common feature of duodenal ulcer, but is absent in more than half the total number of cases. It is often present during the height of the pain and may be absent at other times, or it may be constantly present. Its position may be (a) high up under the right ribs when it probably depends upon adhesions between the under surface of the ribs and the parietal peritoneum. When present we should suspect that there is also gall-stone disease; (b) at the pancreatic point in cases complicated with chronic pancreatitis; (c) in the middle line over on area two or three inches in diameter (Moynihan); (d) occasionally it has been found on the left side of the middle line; and (e) in the upper part of the right rectus.

Physical Signs.—The writer is unable to agree with Moynihan as to

the relative unimportance of physical signs in the diagnosis of duodenal ulcer.* This may possibly be true to a certain extent with respect to the limited number of objective signs to which he confines his attention, viz., epigastric tenderness, accentuation of the right epigastric reflex, rigidity of the rectus, gastric stasis, and hemorrhage; but we have in addition, as he will presently show, valuable signs derived from the examination of the feces and urine, and probably before long from the examination of the contents of the duodenum itself, which he is convinced can aid us materially in the early diagnosis of duodenal ulcer.

The writer's experience points to the fact that in a very early stage of duodenal ulcer there are in many cases distinct evidence of irritation of the pancreas. As regards the direct examination of the duodenal contents, his observations are not yet sufficiently numerous to place the matter on a firm basis; but he thinks that we may say with certainty that the finding of staphylococci, leucocytes, or red corpuscles in the fluid duodenal contents would certainly be a strong argument in favor of organic disease.

Any clinical sign which would absolutely locate and show the presence of a definite lesion in the duodenum must necessarily be of immense value from a diagnostic point of view. For instance, in a case in which the differential diagnosis had to be made between functional hyperchlorhydria and duodenal ulcer, the knowledge that there was a definite lesion in the duodenum would turn the scale in favor of the latter. Such a clinical sign, he believes, we have in an implication of the pancreas, the degree varying from a simple irritation to chronic pancreatitis. The symptoms by which we may recognize it will be presently described in the case histories given.

Pancreatitis unaccompanied by jaundice is most commonly due to the extension of a duodenal catarrh along the pancreatic ducts, which implies a source of irritation in the duodenum. In a case presenting the characteristic pain coming on some time after a meal, the knowledge that such is present would, the writer thinks, justify us in assuming the probability of a duodenal ulcer. In like manner, the absence of the pancreatic reaction would show us that there was no duodenal catarrh, and would incline us to the possibility of the trouble being of a functional nature.

Let us now take a typical case and see how we should set to work to make a diagnosis.

We have, let us say, a patient who has suffered for some years from periodical attacks in which he gets pain or discomfort, shortly before a meal, relieved by food and alkalies, and in many cases the symptoms come

---

*"These symptoms so perfectly characteristic of duodenal ulcer may be present for years, without producing any physical signs. It is therefore not necessary to the attaining of an accurate diagnosis that any examination of the patient be made. The anamnesis is everything; the physical examination is relatively nothing. There is, in the stage when the presence of ulcer should be recognized, no single physical sign indicating the presence of organic disease." Duodenal Ulcer, by B. G. A. Moynihan, p. 109, London, 1910.

on soon after he has retired to bed and keep him awake for a considerable time.

On examination we may or may not find a tender spot to the right of the midline in the front of the abdomen, together with a tender place to the right of the spine in the small of the back. We find that the right rectus muscle becomes rigid on attempted palpation and is slightly hypertrophied. The question arises, Is there anything which we can do to make the diagnosis more certain? The writer thinks that there is, but first of all let us pass in review the principal affections with which a duodenal ulcer may be confounded, and from which it must be differentiated.

(a) *Gastric Neurasthenia.*—It is an exceedingly common circumstance that this condition is diagnosed when a duodenal ulcer really is present. The writer thinks this is mainly due to the fact that the periods of remission lead observers, who are not acquainted with the symptom-complex of duodenal ulcer, to think that organic disease is thereby excluded. The hunger pain of duodenal ulcer is mistaken for the discomfort before meals so quickly relieved by food, and constantly met with in neurasthenics, and the flatulence of aerophagia often closely resembles the pneumatosis of duodenal ulcer. Moreover, in neurasthenia there is local tenderness which, although it is usually distributed along the course of the colon, is well marked at the duodenal point, and the observer finding it present there does not look for tender spots in other parts of the abdomen.

(b) *Pyloric Spasm Due to Reflex Irritation.*—This is one of the common conditions from which duodenal ulcer has to be distinguished, the irritation proceeding from the appendix or other part of the intestine and producing painful spasm of the pyloric antrum. Doyen believes that in these cases there is invariably some erosion of the mucosa, but he is probably wrong.

(c) *Gall-Stone Disease.*—Whilst, on the one hand, the recurring attacks of regional peritonitis so frequently met with in longstanding duodenal ulcer may simulate gall-stone colic, on the other, a stone impacted in the cystic duct, with a contracted gall-bladder may produce symptoms resembling those of duodenal ulcer. In a certain number of these cases there is a colicky pain about three hours after a meal, possibly due to reflex contraction of the gall-bladder from entrance of acid chyme into the intestine.

The first thing, of course, is to attempt to exclude chronic appendicitis and gall-stone disease. With this end, we examine the appendix thoroughly both by palpation of the abdomen and also through the rectum and vagina. In the vast majority of cases of chronic appendicitis there will be found distinct tenderness at McBurney's point, and occasionally, when the appendix is in a favorable position, it may be felt as a rounded painful rod.

Having ascertained as much as we can by such an examination, we

should subject the urine and feces to a thorough investigation. If a laboratory is available we can, of course, send the material there, but the tests are not difficult and, with the exception of the estimation of the fat, are within the capacity of any practitioner. The different points which we must note are in the case of the urine—the presence of indican, bile, urobilin, sugar, crystals of calcium oxalate, and the pancreatic reaction (Cammidge's). In the feces, we note the reaction, presence of stercobilin, occult blood, the amount of total saponified and unsaponified fat respectively, the result of the casein digestion (pancreatic insufficiency) test, the character of the fermentation in Schmidt's tube and the amount of gas formed, the total amount of inorganic ash, and microscopically the presence of undigested muscle-fibre and of triple phosphate crystals.*

The following notes from the writer's case-book will be of interest as showing the practical application of the principles which he has enunciated.

Dr. D., æt. forty-five, consulted me in February, 1909, with stomach trouble dating from 1906. His symptoms were pain at the junction of the lower and middle thirds of a line joining the umbilicus and costal margin at the right mammary line, coming on about three hours after food and often accompanied by faintness and constipation. The pain was relieved by food and alkalies. There was distinct tenderness on deep pressure at the painful spot, but no superficial hyperesthesia or dorsal tender point. The fasting stomach contained a small amount of opalescent fluid, the total acidity of which was 40; no free HCl, but an excess of mucus. After a mixed test-meal, the total acidity was 90, free HCl 40, combined HCl 45. An examination of the urine and feces by Dr. Cammidge gave the following:—

Urine.—Traces of a reducing sugar too small for actual measurement. Traces of urobilin. Pancreatic C. reaction positive, there being some fine crystals soluble in five to ten seconds. Considerable amount of indican.

Feces.—Alkaline reaction; well-marked reaction for stercobilin; total fat 20.3 per cent.; unsaponified fat 3.5 per cent.; saponified fat 16.6 per cent.; organic matter not fat, 55.5 per cent.; inorganic ash 24.2 per cent. Considerable undigested muscular fibre. No occult blood. Many triple phosphate crystals.

In this case the diagnosis virtually lay between gall-stone, duodenal ulcer, and functional hyperchlorhydria. From the findings it could be said definitely that there was some hyperchlorhydria, some chronic gastritis and some chronic pancreatitis. The traces of urobilin pointed to some disturbance of the function of the liver, and probably some cholangitis, but the absence of bile-pigment showed that there was no obstruction to the free flow of the bile into the intestine, and negatived the idea

---

*The method of performing the above tests and their clinical significance will be found in a little work, Clinical Pathology (London, 1911), especially written for the practitioner by the writer and others.

that the pancreatitis might be secondary to obstruction of the common-duct by gall-stones. That there was chronic pancreatitis was proved by the glycosuria, the pancreatic reaction, and the excess of muscle-fibre in the feces. That there was as yet no very considerable disturbance of the pancreatic secretion was shown by the absence of any marked excess of unabsorbed fat.

We had, then, in this case to deal with a pancreatitis in its earliest stage probably not due to gall-stones and associated with hyperchlorhydria. That this was associated with catarrh of the upper part of the intestine was suggested by the presence of indican in the urine, the alkaline reaction of the stools, and the excess of saponified over unsaponified fat. The high percentage of inorganic ash, and the presence of triple phosphate crystals further pointed to a concomitant colitis.

The inference naturally arose that the pancreatitis was the result of the extension of catarrh from the duodenum; and taking into consideration the character of the pain and of the gastric secretion it was legitimate to deduce the presence of a duodenal ulcer.

Acting upon this belief, an operation was performed by Mr. Mayo Robson on February 11th, and an ulcer was found in the duodenum on the posterior wall on the duodenal side of the pylorus. There were in addition numerous adhesions between gall-bladder and pylorus, and between the pylorus and stomach.

On November 22nd, 1911, the writer saw the Rev. Canon X. in consultation with Mr. Mayo Robson who agreed with him that a thorough investigation of the case should be made before any operative measures were entertained.

He was sixty-six years of age, and for the last ten years had suffered from attacks of pain, sometimes severe and occasionally accompanied by sickness. There were no rigors or hiccough. The position of the pain could not be given very accurately, but it was apparently in the epigastrium to the right of the middle line, and sometimes under the edge of the right lower ribs. There is no rigidity of the recti muscles and no tenderness on deep palpation.

The essential points presented by the urine and feces, upon examination in Dr. Cammidge's laboratory, were the following:—

Urine.—Indican,—a well-marked reaction. Bile—nil, urobilin—nil, pancreatic reaction—negative, calcium oxalate—nil. Examination of another sample by the writer showed a distinct green ring with Rosin's test.

Feces.—Reaction—strongly alkaline. Stercobilin—well-marked reaction. Occult blood—well-marked reaction. Pancreatic insufficiency test —casein digestion incomplete. Total fat—47.7 per cent. (normal 15-25 per cent.). Unsaponified fat—10.0 per cent. (normal 10-15 per cent.). Saponified fat—28.7 per cent. (normal 10-15 per cent.). Inorganic ash —20.5 per cent. (normal 10-15 per cent.). Microscopically, no muscle-

fibre. The deductions which we can legitimately form from these findings are as follow:—The well-marked reaction for indican in the urine points to there being some abnormal putrefactive changes in the upper part of the intestine. This is confirmed by the strongly alkaline reaction of the stool, the high percentage of inorganic ash, the presence of mucus and triple phosphate crystals and the marked excess of saponified fat, which also suggests that the large bowel as well as the small is affected.

The absence of the pancreatic reaction (Cammidge's) in the urine is against there being any degenerative changes of an inflammatory nature in the pancreas at the present time, but the incomplete casein digestion in the stools shows that there is some interference with the digestive function of the pancreas and in part explains the high percentage of total and unsaponified fat.

The well-marked reaction for occult blood shows that there is some ulcerated surface in the course of the gastro-intestinal tract.

The intermittent presence of bile-pigment in the urine shows that there is sometimes an obstruction to the free flow of bile into the intestine, such as might accompany a floating gall-stone, but the negative reaction for urobilin is against there being any active cholangitis at the present time.

The marked hyperchlorhydria may be due to the irritation of gall-stones, a chronically inflamed appendix, or a duodenal ulcer. It may be the result of irritation of retained food residues or it may be of a purely functional nature.

In this case there is no retention of food residues, and functional troubles are rare at his age. The position of the pain under the edges of the right lower ribs strongly suggests gall-stones, and this is confirmed by the presence of bile-pigment in the urine.

The pancreatic insufficiency test suggests possible cirrhosis of the gland as the result of past inflammation and, in conjunction with the presence of indican in the urine, definitely locates a source of irritation in the duodenum. There being no piles or hepatic cirrhosis the marked reaction for occult blood clinches the matter and enables us to assert, with as much certainty as we can, short of an explanatory operation, that there is a duodenal ulcer.

The distinct tenderness over the region of the appendix renders it possible that we have in addition an inflamed appendix.

Whilst writing these words the writer has just come away from the operation by Mr. Mayo Robson, at which was found a chronically inflamed appendix, a very large duodenal ulcer, and three large gall-stones. He will now proceed to describe briefly the method in which he treats a duodenal ulcer in which there are no urgent symptoms calling for immediate operation, and in which the patient is willing to submit to the necessary restrictions.

1. The first thing to do is to make absolutely sure that there is no possible infection from the mouth.

In this connection it is not sufficient to ascertain that no pus exudes from the gums when pressure is applied to the sides of the process. Infection may be taking place through the bony tissues, and this can only be discovered by taking x-ray photographs of the teeth. In such films the precise degree of absorption of the bony socket is apparent, and any septic absorption will be shown by patches of rarefying osteitis in the bone between the roots of the teeth. Such inflammatory process is shown by a whitish mottling of the film. The writer may say that it is not usual to make prints from the x-ray negatives of the teeth. The negative films are themselves examined and give all the information required. As such negatives are taken upon small pieces of flat film, they are readily stored with the other notes of the case in small envelopes.

2. The next step is to obtain some of the duodenal contents. In all cases, which the writer treats medically, he makes it a matter of routine to obtain some of the contents of the duodenum and examine it bacteriologically. If any predominant organism is found, a pure culture is made from it, and the opsonic index of the patient determined towards it. If this should be found lowered, a vaccine is made and injected into the patient. No harm can possibly ensue from this, and he feels convinced that the rapid cure which he has often obtained has been largely contributed to by this procedure.

We have two methods of obtaining the contents of the duodenum; that of Einhorn, of New York, by direct intubation, with his special apparatus, and the method of regurgitation. The latter is the one which the writer has up to the present adopted, as it is easy, devoid of danger, and involves nothing more than the passage of the ordinary soft rubber stomach-tube. This method of obtaining the contents of the duodenum is based upon the work of Boldyreff,* Faubel, Volhard and Molnar,** and depends upon the fact that, if 5 or 6 oz. of olive oil are introduced into the stomach and removed after half an hour, a certain amount of viscid or thin fluid varying in color from white to dark green comes away with it, and after standing for a few minutes separates itself sharply from the oil, forming a layer at the bottom of the beaker. As this liquid on examination is found to contain bile and trypsin it must obviously consist of duodenal contents which have regurgitated into the stomach. As regurgitation occurred in 79 per cent. (Faubel), 86 per cent. (Volhard), 96 per cent. (Molnar), and 70 per cent. (Lewinski),† the test may be considered to have reached the practical stage.

3. The patient is put absolutely at rest in bed. One of the main points, and incidentally the chief difficulty in treating duodenal ulcer is to induce the patient to remain long enough in bed. When in the recumbent position the drag of the stomach and duodenum is taken off from its attachments and also the emptying into the duodenum is mechanically

*Deutsch. med. Wochenschr., Vol. II, p. 1582, 1908.
**Zeitschrift fuer klin. Med., Vol. LXVII, p. 188.
†Deutsch. med. Wochenschr., Vol. II, p. 1582, 1908.

facilitated, both are of important help in the cure of the affection. The writer is certain that two weeks in bed is the absolute minimum and three would be better. The patient should bear in mind that he is attempting to save himself a serious operation, and should not handicap the physician, who is trying to help him, by grudging the necessary time.

4. An attempt is made to remedy any deficiency of antitryptic and antilytic substances in the blood. The breakdown of the immunity to autolysis which permits a duodenal ulceration to take place is now explained as due to a deficiency in the blood of antiferments, which should normally prevent it. The presence of anti-enzymes and antilysins in normal serum having been definitely established by laboratory work, its empirical administration, as a possible means of re-establishing the natural condition of immunity of the gastric and duodenal mucous membrane, was first suggested by Dr. Hort in 1907. On the whole, the clinical results obtained by it have been surprisingly good, and more than justify its routine administration. Normal horse-serum has the advantage of not only containing a very large quantity of antibodies, but also of being an article of commerce and easily obtainable.* In cases of duodenal ulcer it is best given by the mouth, because we avoid the risk of the unpleasant toxic effects occasionally following the hypodermic administration of serums; because we are able to avail ourselves of its direct stimulating effect upon the surface of the ulcer itself; and for the reason that it will fix any hydrochloric acid and residue of tryptic and peptic bodies remaining uncombined with the proteid of the food in the stomach. For the last reason it should be given directly after food. The writer is sure that some of the comparatively unsatisfactory results which he obtained in the first cases which he treated with it were due to the fact that he administered it when the stomach was empty. The direct healing action of the serum upon the ulcer is probably of considerable importance. Serum has been shown to contain, not only the protective bodies which antagonize the destructive toxins of cells and bacteria, but also substances which stimulate the repair of tissues. These *stimulins* can be demonstrated by the reaction produced when normal serum is applied to an old, sluggish, superficial ulcer. As a matter of fact we now use almost exclusively a specially prepared serum (Antilusin, Allen and Hanburys), in which the proteolytic enzymes have been removed and the antiferments concentrated into a small bulk. The dose of serum is usually 10 c.cm. given by the mouth in a little cold water directly after the chief meals.

5. The acidity of the gastric juice must be kept as low as possible. It was formerly supposed that an excess in hydrochloric-acid acidity in the gastric juice was an important factor in the production of gastric and duodenal ulcer. We now know that such is probably not the case.

*Normal horse-serum, prepared by the Lister Institute, Allen and Hanburys, and Burroughs Wellcome, Snow Hill.

and that granted a reduction in the resisting power of the gastric or duodenal mucosa, gastric juice of normal acidity is quite capable of determining an ulcerative process. That the reduction in the acidity of the gastric juice is an important factor in the cure of duodenal ulcer must be apparent from the experiments of Bolton, who found that the gastric ulcers, which are invariably caused by the injection of gastrotoxic substances into the peritoneums of guinea-pigs, were not formed if the acidity of the gastric juice was kept below normal by neutralization.

In practice the writer attempts to diminish the acidity of the gastric juice by giving 8 or 10 oz. of hot Vichy water two hours after meals or the following powder stirred up in hot water:—

R Sod. bicarb.....................................gr. x
   Calcii Carb....................................gr. x
   Sac. Lactis....................................gr. x
   Ess. Menth. pip................................m. ii

6. We must secure the stomach against distension. One of the chief ways in which a gastro-enterostomy conduces to the healing of a duodenal ulcer is by preventing distension of the stomach. We can secure much the same result (a) by preventing pyloric spasm by the administration of atropine and alkalies; (b) by giving the food in small amounts at comparatively short intervals and in a finely divided condition; (c) by giving the drink, which should be hot water, not with the meals, but when the stomach is empty. It will then pass quickly out of the stomach and incidently wash and cleanse the surface of the ulcer in the duodenum.

7. The bowels must be kept freely open. The formula which the writer usually first prescribes for this purpose is the following which although not pleasant is of extreme efficiency: —

R Magnes. Sulph..................................ʒvi
   Ext. Cascara Liquid (Parke, Davis & Co.).......ʒiii
   Tinct. Belladon................................m. xxx
   (This is omitted if the patient is already taking belladonna
   in the powders.)
   Aq. Chloroform, ad.............................ʒvi

Sig. One-sixth part is to be taken at bedtime mixed with an equal quantity of water. This dose may be increased or diminished according to the effect produced.

In these cases preparations of aloes should be avoided and also those of agar-agar.

8. Any anemia present must be treated. In order not to interfere with the medicaments which are being given by the mouth, the writer invariably administers the iron in this affection by intramuscular injection into either the deltoid or the glutei. His favorite preparation is the cacodylate of iron in doses of gr. 0.01 made up to 1 c.cm. with normal saline solution.

9. A suitable diet must be prescribed. This has to fulfil the following indications:—

(a) It must have a high combining power for the acid of the gastric juice.

(b) It must excite the flow of gastric juice as little as possible.

(c) It must not distend the stomach.

(d) The products of its digestion must be as unirritating as possible to the ulcer.

(e) It must provide a sufficient number of calories to preserve the equilibrium of the patient.

All these indications are met as far as is humanly possible by pounded meat, chicken and bread.

The physiological exciters of the gastric juice are (a) the psychical agents, viz., the flavor of the food and the act of mastication, and (b) those which act by direct contact with the gastric mucous membrane.

The act of mastication is one of the most powerful emotional exciters of the gastric secretion, especially if the food be sapid and tasty. The deduction is that in the dieting of cases of ulcer of the stomach and duodenum we should make use of meats which contain the least amount of flavoring extractives, such as the more gelatinous parts of veal, calves' head, tripe, and chicken, and cook them in such a manner (boiling or steaming) as will not develop the flavoring principles which they do contain. Secondly, the food should be presented to the patient in such a finely-divided condition as to require little or no mastication. We can do this in practice by the preparation of purées and panadas. The simplest panada is ordinary bread sauce, which may be given to a patient with duodenal ulcer after the second or third day, often from the very first. Properly made it is a delicate and appetizing dish, and the pheasant or partridge which would accompany it under happier auspices may be conjured up by the imagination of the patient. Panada of chicken, our mainstay in the treatment of many gastric affections, is made by taking a raw fowl, boiling or steaming it until tender, cutting the meat from the bones, passing three times through a mincing machine, pounding in a mortar to a paste with bread soaked in milk, sieving and warming with a sufficient amount of veal stock to bring it to a consistency of the aforesaid bread sauce.

Unfortunately patients generally get very tired of panadas and pounded meat after a few days, and ask sorrowfully whether it would not be the same if they chewed the food thoroughly. It should be explained to them that this is exactly what we want to avoid, and that the very insipidity and tastelessness of the food is an important part of the treatment.

As concrete examples of the foregoing theoretical considerations, the writer gives the actual diet and prescriptions of a patient who was recently under his care on the first, sixth and fifteenth day of the treatment.

DIET FOR THE FIRST DAY.

7 a. m.   Half a pint of equal parts of hot water and Vichy.

8 a. m.   Meat-jelly. Pounded meat or pounded chicken. Raw egg or boiled egg. Breakfast biscuit or one piece of toast Melba. Butter. One wineglassful of water.

11 a. m.   Hot water and Vichy, or powder stirred up in half a pint of hot water.

1 p. m.   Meat-jelly. Pounded meat or pounded chicken. Raw egg or boiled egg. Breakfast biscuit or one piece of toast Melba. Butter. Wineglassful of water.

4 p. m.   Hot water and Vichy, or powder.

6 p. m.   Meat-jelly. Pounded meat or pounded chicken. Raw egg or boiled egg. Breakfast biscuit or one piece of toast Melba. Butter. Wineglassful of water.

8 p. m.   Hot water and Vichy, or powder.

11 p. m.   Meat-jelly. Pounded meat or pounded chicken. Raw egg or boiled egg. Breakfast biscuit or one piece of toast Melba. Butter. Wineglassful of water. Half an ounce of the purgative mixture at bedtime.

Dose of serum to be given directly after the meals at 8 a. m., 1 p. m., and 6 p. m., mixed with a little water.

During the night, if awake, a sandwich made with very thin bread and butter and pounded chicken may be taken, or jelly, pounded meat, or pounded chicken. Breakfast biscuit.

The jelly allowed in this diet list is the meat-jelly specially prepared for these cases.

DIET FOR THE SIXTH DAY.

7 a. m.   Half a pint of equal parts of hot water and Vichy.

8 a. m.   Meat-jelly. Pounded meat. Pounded chicken. One wineglassful of water.

11 a. m.   Hot water and Vichy, or powder stirred up in half a pint of hot water.

1 p. m.   Meat-jelly. Pounded meat or pounded chicken. Wineglassful of water.

4 p. m.   Hot water and vichy, or powder.

6 p. m.   Meat-jelly. Pounded meat or pounded chicken. Wineglassful of water.

8 p. m.   Hot water and Vichy, or powder.

11 p. m.   Meat-jelly. Pounded meat or pounded chicken. Wineglassful of water.

Half an ounce of the purgative mixture at bedtime in water.

Dose of serum to be given directly after meals at 8 a. m., 1 p. m., and 6 p. m., mixed with a little cold water.

During the night, if awake, a sandwich made with very thin bread and butter and pounded chicken may be taken, or jelly, pounded meat, or pounded chicken. Breakfast biscuit.

The jelly allowed in this diet is the meat jelly specially prepared for these cases.

DIET FOR THE FIFTEENTH DAY.

7:30 a. m.   Half ounce of olive oil.

BREAKFAST.

Special meat-jelly. Boiled eggs. Toast Melba. Breakfast biscuits. Butter. Wineglassful of water. Small cup of *cacao a l'avoine,*[*] or Cocatina.

———
*Cacao a l'avoine, Manuel Frères, Lausanne.

11 a. m.   Half a pint of equal parts of hot water and Vichy, or powder in hot water.   Half an hour before lunch half an ounce of olive oil.

LUNCH.

Roast or boiled chicken or pigeon.   Underdone roast mutton or lean of chop or cutlets without a particle of skin or fat.   Boiled sole or whiting.   Purée of potatoes.   Breakfast biscuits.   Toast.   Butter.

4 p. m.   Hot water and Vichy, or powder in hot water.

Half an hour before dinner half an ounce of olive oil.

DINNER.

Panada of chicken, roast or boiled chicken or pigeon.   Underdone roast mutton or grilled lean of chop or cutlets without a particle of skin or fat.   Boiled sole or whiting.   Purée of potatoes.   Spaghetti or nouilles.   Boiled rice.   Breakfast biscuits.   Toast.   Butter.   One wineglassful of water.

10 p. m.   Hot water and Vichy, or powder in hot water.

In conclusion the writer would say that the majority of the patients who fail to get cured by non-surgical means owe their misfortune, not to the fact that the disease is incurable, but because they are unwilling to give the doctor the necessary facilities for doing his work.   They refuse to lie in bed a sufficient length of time, they refuse to continue the diet because it does not appeal to their palate, and they resent the deprivation of tobacco, tea, and alcohol.

They would doubtless be more amenable if they were really aware of the life-risks which are constantly present to those people who carry round within them, as their constant companion, an unhealed duodenal ulcer, and should embrace gladly the chance of avoiding an operation which must of necessity endanger their life and moreover does not invariably cure the disease.

THE USE OF THE PROCTO-SIGMOIDOSCOPE IN DIAGNOSIS AND TREATMENT.

By Prof. H. Strauss, M. D., of Berlin.

Despite the close relationship between proctoscopy and sigmoidoscopy, it is only within the last twenty years that the latter procedure has found a place among diagnostic methods. Proctoscopy, on the other hand, was practised by Hippocrates. To Howard Kelly must be given the credit of introducing the sigmoidoscope into our armamentarium, though his instrument was rather imperfect and, according to his own reports, could be used successfully only in a certain percentage of cases. Otis, by his insistence upon the knee-chest position as the proper one for the successful performance of sigmoidoscopy, added impetus to the development of the procedure. A still further advance was marked by the introduction of the pneumatic attachment. The pneumatic sigmoidoscope was first used in America by Pennington, Laws and Tuttle and independently in Europe by the writer. With the aid of this instrument a large number of cases, which could not be examined with the older instruments on account of the inability to pass the entrance of the sigmoid, were brought within our diagnostic reach. The pneumatic principle has been attacked by some men as bringing danger into the procedure. It is true that a certain amount of caution is necessary in its use. If, however, the operator proceeds carefully, pumping only a little air into the tube at one time and doing the pumping himself instead of intrusting this to some assistant, he will never be able to assert that the pneumatic attachment is a source of danger. The fact is that the pneumatic proctoscope has found a place among internists, surgeons and gynecologists of all parts of the world, and is attaining the same importance in the diagnosis of conditions in the lower bowel as the cystoscope and laryngoscope have already attained in their respective fields.

As a result of his own experience, the writer believes that he does not exceed the truth when he says that successful sigmoidoscopy can be performed in over 90 per cent. of all individuals. This, of course, excludes those cases with organic or dynamic stenosis, or with kinks of the bowel due to some pathological process.

The writer will not here enter into a description of the technique of proctoscopy and sigmoidoscopy. This can be found in his book (Die Proctosigmoscopie, G. Thieme, Leipzig, 1910), as well as in the literature on the subject. It is only his purpose now briefly to call attention to the importance of procto-sigmoidoscopy in diagnosis and treatment. The

greatest value of the procedure is certainly in the province of diagnosis, and its therapeutic value is mainly an indirect one. Nevertheless, he will point out further on in this article certain direct advances in treatment, which the method has made possible.

It is noteworthy that the introduction of sigmoidoscopy has been a stimulus to the use of the much older procedure of proctoscopy. Up to a few decades ago the latter was practised only in exceptional cases, though we now know (thanks to sigmoidoscopy) that the indications for it are far from infrequent. The more general use of procto-sigmoidoscopy has as a result given us an objective basis for a large range of symptoms which formerly were to be interpreted mainly by the combinations in which they occurred. The meaning of these symptoms may now be grasped at a glance,—if I may be permitted the figure. Anyone who has had a little experience in making these examinations is astonished at the number and variety of proctitic processes which can give rise to such common symptoms as tenesmus, darting pains, or frequent desire to go to stool. Only since the systematic use of the proctoscope have we learnt how frequent are those hemorrhagic inflammations, in no way related to hemorrhoids, which occur in the ampulla recti. I might also call attention to the very troublesome condition to which I have given the name *proctitis sphincterica*. This is especially frequent in constipated individuals, often in association with hemorrhoids. The use of the proctoscope is especially indicated in all bleeding conditions. We can no longer be content with the rather indefinite diagnosis of hemorrhoids in those cases in which fresh blood is passed per rectum. It has long been known that bleeding may be the first symptom of a rectal cancer, and it is not difficult to realize the immense aid which the procto-sigmoidoscope has brought to the diagnosis of this condition. Especially when the growth lies beyond the reach of the palpating finger, high in the rectum or in the sigmoid, is the early diagnosis wellnigh impossible without the aid of procto-sigmoidoscopy. The writer, however, wishes not to convey the impression that the digital examination has become obsolete and useless. No instrumental examination should be made which has not been preceded by a digital. But he can recall more than a half dozen cases in which the diagnosis of malignancy was based solely on the sigmoidoscopic findings. Fedoroff, Schreiber, Tuttle and others record the same experience.

It is not alone in the diagnosis of malignant growths that the instrument has rendered such valuable service, but also in the differential diagnosis of other tumors of the lower bowel, especially of polyps. In such doubtful cases the writer has long been in the habit of excising a small piece for pathological examination. This is easily accomplished by means of a forceps constructed for the purpose, and if properly carried out is devoid of danger. The knowledge which can be thus gained will often relieve many an anxiety for physician and patient alike, by defining clearly the surgical indications in the case.

There is yet another field of diagnosis in which procto-sigmoidoscopy has shown its great worth—namely, in the inflammatory and ulcerative processes of the lower bowel. In fact, the writer believes he does not strain the truth when he says that the diagnosis of ulcerative sigmoiditis and the various forms of chronic sigmoiditis has only been made possible by the introduction of the sigmoidoscope. We have by this means come to recognize quite a variety of diseases, some of them of rather grave import and requiring surgical intervention. In certain of these, the clinical picture is not to be distinguished from that of carcinoma. The writer has demonstrated at autopsy that there may exist such a condition as a localized ulcerative procto-sigmoiditis. That this is no trivial condition, and that it carries with it the danger of fatal complications, has been brought home to him by the operation of a number of cases of ulcerative colitis. Some of these cases show no bleeding but run along with only the discharge of pus and mucus. The diagnosis depends on a properly conducted sigmoidoscopy. Likewise in cases of benign stenosis the sigmoidoscope has done valiant service.

The writer would like to emphasize the necessity of a systematic routine in making these examinations. He can recall 3 cases of bleeding from the bowel, in which he found a hemorrhagic proctitis which fully explained the clinical symptoms. Fortunately, he did not allow the examination to rest here; and upon inserting the longer tube found a carcinoma of the sigmoid, which in two of the cases had not passed beyond the stage of justifiable surgical intervention. It is advisable, therefore, whatever the findings may be, to follow the proctoscopy with sigmoidoscopy.

As a means for carrying out local therapeutic measures the instrument is not new. The cauterization of ulcers with silver nitrate, or the local application of dusting powders by insufflation through the tube, has become a common procedure. In several cases the writer has through the tube succeeded in removing polyps from the sigmoid with the cauterizing snare, thus obviating the necessity of abdominal section. In dilating strictures of the rectum he no longer inserts the bougie blindly in an endeavor to engage its tip in the opening of the stenosis. It is much simpler, by means of the proctoscope, to conduct the entire procedure in plain view. On the other hand, the use of the instrument for giving the so-called high injections is futile, for this can only be accomplished by injecting fluid into the rectum in amounts sufficient to fill up the bowel from below. Nor has he ever felt justified in dividing a prominent rectal fold or valve on the ground that it was the cause of a chronic constipation. In those cases of constipation, in which such an enlarged rectal fold has occurred, it has never been found so firm and unresisting that it could be looked upon as an obstruction to the passage of the intestinal contents.

The writer has attempted to enumerate some of the indications for the

use of the procto-sigmoidoscope. There are many others which a lack of space will not allow him to detail. After all has been said, however, it must be acknowledged that the one all-important service of the instrument is in the early diagnosis of carcinoma. The fact that in certain cases, such as those accompanied by acute inflammation of the bowel or surrounding tissues, it is impossible to introduce the instrument satisfactorily cannot be logically urged against the value of the entire method. Nor can it be considered a great defect of the method that, in patients suffering with joint-disease, extreme prostration, anemia or dyspnea, the knee-chest position, which the writer considers the one of choice, is impractical. In such a contingency the examination is attempted with the patient on the left side and the pelvis elevated. Difficulty is sometimes encountered during the examination, because the bowel is not entirely empty. This can be obviated by proper preparation of the patient with enemas or, in the case of diarrhea, with opium. Local or general anesthesia is scarcely ever necessary. In the great majority of cases a properly conducted examination causes the patient no inconvenience whatsoever, and the writer believes that it is for this reason particularly that the method has attained such rapid popularity.

It is scarcely necessary to add in conclusion that procto-sigmoidoscopy should not displace our other methods of diagnosis. The information that is at times obtained by palpation may be far different from that gained by inspection. Nor are the various laboratory aids, the examination of the feces and the blood, to be neglected. On the other hand, the writer has entirely abandoned the use of the rectal sound, for he finds that this gives no more information than can be obtained by the sigmoidoscope. It is impossible to pass either instrument further than the junction of the rectal loop of the sigmoid with the colonic loop; so there can be no advantage in sounding. It remains for the future to develop a technique which will allow us to pass this barrier and make the parts beyond as accessible as the terminal portion of the bowel now is. For the present we may rest satisfied with what has been accomplished in the relatively short period of one decade, for only within the past fifteen years has the method come into general use.

THE DIAGNOSTIC VALUE OF THE TEST FOR OCCULT BLOOD IN THE STOMACH-CONTENTS AND FECES.

By Horace W. Soper, M. D., of St. Louis.

Boas[1] was the first to direct attention to the clinical value of the test for minute quantities of blood in the stomach-contents and feces. He used the guaiac-turpentine test,as modified by Weber.[2] His results were soon confirmed by Rossel,[3] Hartmann,[4] Schloss,[5] Schmilinsky,[6] Jaworski and Karolewicz,[7] and others. Rossel advocated the employment of the aloin test.

The benzidin test of O. and R. Adler[8] was improved by Schumm,[9] and Schlesinger and Holst.[10] Einhorn[11] modified this test by preparing paper impregnated with benzidin.

Boas[12] has recently recommended the phenolphthalein test.

Each of the above tests has its adherents among clinicians. The benzidin test has been criticized as being too sensitive for practical purposes. The phenolphthalein test as yet lacks confirmation. Weber's modification of the guaiac-turpentine test, the oldest and the most widely employed, will be the only one described in detail here. The technique is as follows:—

A portion of the feces, about the size of a walnut, should be selected, avoiding surfaces covered with mucus, mixed with water and rubbed well in a mortar to a thin mushy consistency. If the stool is liquid, the sediment should be selected without the addition of water. Pour 5 to 10 c.cm. in a large test-tube, add one-third volume of glacial acetic acid, mix well, add equal volume of ether and extract slowly. Use a rubber cork and tilt the tube in order to bring the largest possible surface of the fluid into contact with the ether without permitting them to be mixed together. Should a mixture, however, occur, the resulting emulsion may be filtered and the filtrate used. At least three minutes' time is required to complete the extraction. The ethereal extract is carefully poured off into a second test-tube and 10 to 15 drops of freshly prepared tincture of guaiac and 20 to 30 drops of old oil of turpentine added. Shake well in the air without corking or covering with the thumb. The appearance of a blue or violet color indicates the presence of blood. Should the color not appear at once, fill the test-tube two-thirds full of water. The ethereal extract will float on the surface, and the color-change is more readily detected. Other colors may appear, but after much discussion, observers are practically unanimous in advising *that only a blue or violet color should be accepted as a positive reaction.* The color is not lasting, but fades and disappears in a few minutes.

Siegel[13] has shown that test-tubes used for urinalysis (copper salts, etc.) may give the reaction; therefore, the tubes and mortar used for the blood test must be kept separate and employed for no other purpose, and, of course, kept scrupulously clean.

The turpentine is prepared by filling large wide-mouthed bottles, setting them aside uncorked until thickening (ozonizing) occurs.

The writer[14] has demonstrated that it is not necessary to prepare the fresh tincture of guaiac each time, but that a tincture may be prepared which will keep for many months without deterioration, and which is more sensitive and uniform than the varying daily-prepared fresh tinctures. The method of preparing the tincture is as follows: Rub the guaiac resin in a mortar to a fine powder, slowly adding 95 per cent. alcohol. Be sure to have a residuum of guaiac in the mortar, thus insuring a strong tincture. Filter and keep in a glass-stoppered bottle. Dilute a portion of this stock tincture with 95 per cent. alcohol (tincture 1 part, alcohol 5 parts), and keep in a smaller glass-stoppered bottle for daily use.

Schrœder[15] asserts that two solutions of the guaiac should be used, as feces with a strong blood-content require a strong solution of the guaiac to bring out the blue color while feces with a weak blood-content require a dilute solution of the guaiac. Rothschild[16] showed this to be unnecessary if Schumm's directions for the preparation of the guaiac are followed, viz., about 0.5 grm. of guaiac are shaken in 5 c.cm. of 90 per cent. alcohol for one minute. The writer is convinced that the 1 to 5 dilution of the stock tincture, as already described, will react to feces containing large or small quantities of blood.

Meat including fowl and fish, and all meat soups and extracts must be excluded from the dietary for a period of three days before the test is made. All possible sources of accidental bleeding must be kept in mind, e. g., gums, throat, nose, etc. In females the menstrual period must be avoided. In bleeding from hemorrhoids the test can be made, provided the stool is firmly formed, by selecting the inner portion and avoiding the exterior. Portal congestion in cirrhosis of the liver and heart disease may also cause bleeding.

Guiart and Garin[17] report 13 cases of trichocephalus in which the occult blood test was positive. In the writer's series, 3 cases of tapeworm were encountered, in all of which the feces reacted negatively to the blood test. Further research is necessary to decide the question as to the reaction of other intestinal parasites.

The Test for Occult Blood in the Stomach-Contents.—v. Leube.[18] Rosenheim,[19] Riedel,[20] Elsner,[21] and others have pointed out that the presence of occult blood in vomitus possesses no diagnostic value.

In the stomach-contents, after an Ewald-Boas breakfast, the test has led to many different conclusions. Matthieu and Roux[22] found it positive in acute ulcer, varying negative and positive in chronic ulcer. Stock-

ton[23] states that its presence indicates ulcer. White,[24] in a series of 50 cases of functional gastric disorders, found the test positive in 15, negative in 35. Both Elsner and Hartmann warn against placing any reliance on the test because many normal cases will give a positive reaction. Both Boas[25] and White found the test negative in several cases of clinically positive ulcer.

As a contribution to this subject, the writer[26] kept records of the examination of the contents of the stomach for occult blood, after a morning test-meal, in 200 cases of functional disorders and normal stomachs. The contents were removed by aspiration with a soft tube, care being taken to exclude those containing visible streaks of blood; the contents were set aside until well settled, the lowest portion of the sediment was selected for examination, thus excluding the buccal and pharyngeal mucus; the guaiac-turpentine test was used. 120 cases gave a positive reaction. 80 cases gave a negative reaction.

It seems clear that no conclusion can be drawn from an examination of the stomach-contents for occult blood. Neither a positive nor a negative reaction can be relied upon.

The Test for Occult Blood in the Feces.—Authorities are unanimous in the opinion that the occult blood-test is of far greater value in the feces than it is in the stomach-contents. The test is of extreme importance in the diagnosis of cancer of the stomach. It may be negative in the rare, diffuse, scirrhous form of the growth. The chief characteristic of cancer bleeding is its persistency even on an exclusively milk diet.

In gastric and duodenal ulcer the bleeding is remarkable for its intermittency. Boas, White, Matthieu and Roux, Citron,[27] Steele,[28] Friedenwald and Rosenthal,[29] and others have emphasized the fact that occult blood will disappear from the feces of ulcer patients in from four to ten days when fed on a diet of milk, soft eggs, gelatines, etc.

The writer in a report of 10 cases of latent ulcer expressed the opinion that the intermittent positive blood-reaction, which is so often observed in the feces of ulcer patients, is probably due to changes occurring in the diet: coarse-fibred foods produce the bleeding, while soft, bland foods check it. Moreover, the deliberate feeding of coarse-fibred vegetables in suspected ulcer cases is a valuable procedure in the differentiation of latent ulcer from the neuroses whose symptomatology is suggestive of ulcer.

An ulcer which continues to bleed for more than six days, on a diet of soft foods, should always excite the suspicion of beginning malignancy, and suggests early surgical intervention.

In cancer of the small intestine, the test has been rarely used, as the diagnosis is usually made at operation or autopsy. Inasmuch as early ulceration is the rule in the cylinder-celled adenocarcinoma, the most frequent form of the growth in this region, the blood test should be of great value in establishing the diagnosis. In 1909, the writer re-

ported a case of multiple carcinoma of the jejunum in which the persistence of the occult blood-reaction in the feces led to an ante-operative diagnosis before obstruction had occurred.[30]

In cancer of the large intestine, the test is of less value than it is in growths in the stomach and small intestine. The reaction is usually present in cancer of the cecum; but lower down, in the descending colon, sigmoid and rectum, occult blood is rarely found until a late period in the progress of the disease. It is in these regions that early visible painless bleeding is of great diagnostic import, as well as the mixture of pus and blood in the later ulcerative stage.

The occult blood test, done occasionally and in a careless manner, often leads to erroneous conclusions and unfortunate results. However, when performed carefully and systematically, with due regard to all the sources of error, it is the most valuable of all the objective methods at our command, in the establishment of the diagnosis of ulcerative lesions in the gastro-intestinal tract.

BIBLIOGRAPHY.

[1] Boas (*Deutsch. med. Wochenschr.,* No. 20, 1901).

[2] Weber (*Berl. klin. Wochenschr.,* No. 19, 1893).

[3] Rossel (*Archiv fuer klin. Med.,* Vol. 76, p. 505, 1903).

[4] Hartmann (*Archiv fuer Verdauungskrank.,* Vol. X, p. 48).

[5] Schloss (*Archiv fuer Verdauungskrank.,* Vol. X, p. 267).

[6] Schmilinsky (*Muench. med. Wochenschr.,* No. 49, 1903).

[7] Jaworski and Karolewicz (*Wien klin. Wochenschr.,* No. 38, 1906).

[8] O. and R. Adler (*Zeitschr. fuer phys. Chemie,* Vol. 41, p. 59).

[9] Schumm (*Deutsch. med. Wochenschr.,* No. 42, 1907).

[10] Schlesinger and Holst (*Deutsch. med. Wochenschr.,* No. 36, 1906).

[11] Einhorn (*Deutsch. med. Wochenschr.,* No. 27, 1908).

[12] Boas (*Deutsch. med. Wochenschr.,* No. 2, 1911).

[13] Siegel (*Muench. med. Wochenschr.,* No. 33, 1903).

[14] Soper (*Journ. Amer. Med. Assoc.,* Vol. LVI, No. 4, 1911).

[15] Schrœder (*Berl. klin. Wochenschr.,* No. 43, 1907).

[16] Rothschild (*Berl. klin. Wochenschr.,* No. 18, 1908).

[17] Guiart and Garin (*Semaine Médicale,* No. 35, 1910).

[18] v. Leube: Spezielle Diagnostik d. inneren Organe, 1904.

[19] Rosenheim: Die Erkrankungen d. Speiserœhre, d. Magens und d. Darmes.

[20] Riedel: Die Krankheiten d. Magens, 1897.

[21] Elsner: Magenkrankheiten, p. 180, 1909.

[22] Matthieu and Roux (Société des Hôpitaux. Abs. *Archiv fuer Verdauungskrank.,* Vol. XII, No. 5).

[23] Stockton (*Journ. Amer. Med. Assoc.,* No. 24, 1909).

[24] White (*Journ. Amer. Med. Assoc.,* No. 6, 1907).

[25] Boas: Magenkrankheiten, Part II, p. 72, Fifth Edition.

[26] Soper (*Archives of Diagnosis,* Vol. IV, No. 2).

[27] Citron (*Deutsch. med. Wochenschr.,* Vol. XXXIV, No. 5).

[28] Steele (*New York Med. Journ.,* No. 3, 1906).

[29] Friedenwald and Rosenthal (*New York Med. Journ.,* No. 6, 1906).

[30] Soper (*Boston Med. and Surg. Journ.,* No. 4, 1909).

THE DIAGNOSIS OF CANCER OF THE STOMACH.

By J. W. WEINSTEIN, M. D., of New York.

INTRODUCTION.

The early diagnosis of cancer of the stomach is of utmost importance, for the success of surgical intervention depends solely on an early diagnosis of the case. Fortunately the time-limit of an early diagnosis has lately been considerably extended; and while formerly the presence of a tumor precluded an operation, nowadays the surgeon does not consider it too late, especially when the seat of the invasion is in the pyloric region. Even carcinomata of the lesser curvature are amenable to resection by removing the right half of the stomach. It is only when metastases have appeared, or when the mesenteric glands become involved, or where the carcinoma is extensive, that the case is too late for operative interference.

It should be clear from the outset that there is no one single sign or test, so far, which absolutely makes the diagnosis. Even the presence of a palpable tumor within the stomach does not clinch the diagnosis, for the palpable tumor may mean a cicatrized ulcer. There is only one single positive sign, and that is the finding in the wash-water of a fragment of the cancer. Such findings are extremely rare. The writer has never found one. But while there is no one single sign or test by which the diagnosis of cancer of the stomach can be established, we are in possession of a large number of facts, features and signs which, though each individually does not mean much, when linked together, however, they present a chain of evidence which spells cancer in most cases. This chain of evidence includes: (1) The history of the patient; (2) the physical examination of the patient; and (3) the various laboratory methods and tests.

THE CANCER HISTORY.

There is such a thing as a cancer history. This comprises several factors:—

The Age of the Patient.—The cancerous age has greatly receded lately. While it used to be taught years ago to be forty or over, we see now cancers in much younger people. The writer had a male of twenty-eight suffering with cancer of the stomach that was confirmed by operation; also a case of lymphosarcoma in a male of twenty-two. We should therefore consider the cancerous age as being about twenty-two or over, with, of course, a much greater preponderance of cancer at forty and over. Under twenty, cancer of the stomach is extremely rare.

The Mode of Onset of the Disease.—This is one of the strongest links in the cancer chain: a sudden, abrupt onset of the disease in a person who had been in perfect health before. As a rule cancer picks out as its victims healthy specimens of humanity. This statement would not agree well with the teachings of Wilson and McCarty of the Mayo clinic* that 71 per cent. of cancer of the stomach develop on the base of an old ulcer. With all deference to the eminent source from which this doctrine emanates, and to laboratory methods in general, most internists are very loath to accept this theory. This is contrary to the experience of most men. A cause and effect of this order could not possibly have escaped the attention of medical men. Any medical man of twenty-five to thirty years' experience would have noticed that his patient, whom he had treated formerly for an ulcer, developed a cancer. How could this escape the notice of the great medical teachers? Did they not, do not all of us, take most careful past histories from the very birth of the patient? And how could a plain, simple, common coincidence like this escape our observation? We would have to admit either that most ulcers are latent, or cancers are latent, or both! As a matter of fact this is not the case at all. And while some ulcers may be latent, most of them are active and give symptoms. There is no doubt about it that some cancers do develop from ulcers, but not in such frightful proportions as Wilson and McCarty would have us believe.

The sudden onset of the disease is a most important factor in a cancer history. In diseases, other than cancer, that closely resemble it in regard to laboratory findings, such as chronic gastritis, this is not the case at all. In the latter it is very hard to get from the most intelligent patient the duration of his illness. The onset is so slow and gradual that the patient is puzzled and will alter his statements as to the duration of his disease several times under cross-examination, while in case of cancer the patient gives the duration of his disease to the day. The patient usually traces the source of all his troubles to some certain meal that had disagreed with him. His statement is absolute and positive. Even in those cases where cancer attacks a person already suffering from some other disease, the time of the invasion of the cancer is plain and evident. *That* time marks a distinct turning-point in the history of the individual. The patient, true, had been sick before, but from a certain date his ailment became suddenly aggravated, he steadily and gradually grew worse, and, in comparison, his former ailment was a mere trifle.

Loss of Appetite.—One of the strongest links in the cancer chain. The loss of appetite may develop from the very start of the disease, or it may set in a few weeks later. But it is always there. It is very rare for a patient with cancer of the stomach to have his appetite preserved, though it is met with occasionally.

Loss of Flesh and Strength.—The most constant symptom of cancer.

It is never absent and sets in from the very onset. It is with a good many cancer patients the most prominent and at times the only symptom. The loss of flesh is steady and progressive almost without a let up.

Anemia.—A steady progressive non-remittent secondary anemia sets in. There is no need to examine the blood to detect the anemia. The pallor of the face speaks for itself.

Short Duration of the Disease.—The history of the patient extends to weeks and months. In a year, or at most one and a half years, a cancer patient is reduced to a skeleton. Many of them do not survive more than a few months. Whenever, therefore, a patient gives the same set of symptoms extending over several years, he is not afflicted with cancer.

The symptoms already enumerated are of prime importance ; for they are almost always present in each cancer history, and that combination of symptoms is not often present in diseases which may be confused with cancer of the stomach.

Symptoms of Secondary Importance.

The writer considers them of secondary importance, for the reason that although very common with cancer, they are also present in a large number of other diseases. Moreover, they are not always present in cancer. To these belong in order of frequency and importance :—

Vomiting.—Vomiting of food and not of water. The time of vomiting varies. It may be shortly after the meal ; usually one or two hours later. Where the cancer invades the pyloric region, the vomiting is characterized by large quantities of foul, putrid food, usually at a late stage of digestion. Vomiting of large quantities of food at night is characteristic of pyloric obstruction, benign or malignant. The writer recalls, however, one cancer patient who had a complete occlusion of his pylorus with an enormously dilated stomach, with very marked peristaltic movements, who had not vomited once during the whole course of his disease up to his very death. Lavage would bring the greatest relief to him. His stomach would almost overflow and still he never vomited. With some patients the vomiting is spontaneous. Others induce it themselves, because they are relieved after the vomiting.

Vomiting of Blood or Coffee-Grounds.—When present it is one of the strongest links in the cancer chain. Unfortunately it is not often present. It is not an early symptom, anyway. Coffee-grounds mean digested blood. It means that the hemoglobin of the blood had been converted into hematin. There is an impression current amongst many practitioners that coffee-grounds always mean cancer, while vomiting of blood means ulcer. This is erroneous, although there is some truth in it. Whenever a big blood-vessel is eroded a copious hemorrhage takes place, the stomach is overfilled and vomiting of fresh blood ensues. Whenever, on the other hand, a small vessel is perforated or oozing of an ulcerated area takes place, and hence a small quantity of blood is present within the

stomach, vomiting does not take place, and the blood, the same as food, undergoes the various cleavage processes, and coffee-grounds are the result.   In cancer coffee-grounds mean an ulcerated carcinoma. In interpreting the significance of vomiting of blood or coffee-grounds, we must always bear in mind the other conditions that are likely to give rise to the same phenomenon.   These are gastric ulcer and pulmonary tuberculosis.   In pulmonary tuberculosis the patient is unreliable in his judgment as to whether the source of the blood is the lungs or the stomach. The patient is also apt to swallow some blood that came from the lung and then vomit it. The following are some points to differentiate pulmonary from gastric hemorrhage. Blood from the lungs tastes sweet; blood from the stomach tastes sour. Blood from the lungs is bright red; from the stomach it is more apt to be dark or black. Blood from the lungs is frothy; from the stomach it is apt to be mixed with food. Cirrhosis of the liver with esophageal varices and some cardiac affections are other causes of gastric hemorrhage.

An aversion to meat is another important symptom.

Pain in the Stomach.—It comes on usually during digestion. It varies considerably in character and intensity. Pain may be absent altogether or it may be very severe. There may be reflex pains in different parts of the body; at times, bloating and heaviness after meals. A common complaint is that the food "lies on the chest" and would not go down, the patient referring, as the place where the food stops, to about the region of the cardia. This symptom is quite common, and it does not mean obstruction of the cardia at all. Belching and sometimes heartburn, which depends on excess of organic acids, are other symptoms.

To recapitulate: The cancer history is characterized by a sudden abrupt invasion of a serious disease in a formerly healthy individual of cancerous age; the duration of the disease dating back a few weeks or months only; acute, sudden, complete loss of appetite; steady progressive non-remittent loss of flesh and strength; steady, progressive anemia. Whenever an adult presents himself with this history, with or without any of the symptoms enumerated under the secondary group, cancer of the stomach should be suspected, and further evidence should be looked for. This evidence, for or against it, will be found in the physical examination of the patient and the various laboratory methods. It should be borne in mind that the cancer history is never volunteered to us by the patient, but we have to get it out by careful and painstaking cross-examination.

The Physical Examination.

This should be systematic and thorough, starting with the pupils, arteries, heart, lungs, etc. The urine and blood should not be neglected. A thorough general physical examination is indispensable in the diagnosis

of any stomach complaint. The stomach is the mouthpiece and mirror of every organ in the body. A large number of patients suffering with pulmonary tuberculosis, cardiac conditions, renal conditions, affections of the pelvic organs, appendix, etc., complain of nothing else but the stomach. Pernicious anemia presents a picture somewhat analogous to cancer of the stomach. As in cancer, the stomach contains no free hydrochloric acid. The stomach is an organ that is harder to understand, and the interpretation of its functional disturbances is much more difficult than that of other organs. After, therefore, a careful survey of all the other organs has been made, and no evidence has been found to explain the history of the patient, the abdomen is examined.

Attention should be paid to the contour of the stomach, whether or not there is any peristaltic movements in the stomach. The size and position of the stomach is to be noted. This can be determined in a simple manner by splashing the stomach.* By careful palpation, we explore whether there is any palpable tumor in the stomach. It should be borne in mind that tumors of the lesser curvature and the fundus of the stomach are not accessible to palpation. The majority of pyloric tumors are not palpable, the pylorus being hidden under the liver. The writer recalls a case of pyloric obstruction where no tumor could be felt, and yet at operation a large tumor the size of a fist was found to be adherent to the liver. Very often an ominous rigidity of the abdominal wall over the stomach is found, which does not admit of any palpation of the stomach at all. The muscular splint is tightly contracted and conceals the tumor underneath. Special attention should be paid to the nutrition of the patient. A dry, wrinkled skin is a frequent concomitant of cancer cachexia. Swelling of the ankles is a late manifestation of cancer of the stomach. In every case of suspected cancer of the stomach the rectum should be examined, and in women also the pelvic organs, for metastases. The presence of metastases precludes any surgical interference. The next step is to give the patient a test-meal.

Evidence of the Test-Meal.

The evidence submitted by the test-meal is of extreme importance. An Ewald test-breakfast is given for the purpose. The test-meal should be examined macroscopically, microscopically, and chemically. Each has its advantages. The information brought out by the macroscopic examination is of great value. It works both ways, negatively and positively. If the test-breakfast consists of a white, milky emulsion, all the particles of which being about even, the contents separating into two layers, one of solids at the bottom and the water on the top, that patient has not a cancer of the stomach even in the face of the cancer history. He may

---

*Weinstein: The Splashing Sound of the Stomach. (*Medical Record*, March 5th, 1910.)

have a cancer in another organ, but not in the stomach. On the other hand, if we find the stomach-contents to be dark like coffee-grounds, or grey, which on making a chemical test, such as the guaiac or benzidin, is proved to be blood, and if there is no free hydrochloric acid in the contents, the diagnosis of cancer of the stomach is almost made.

The gross appearance of cancerous stomach-contents in general is of several types. In the earlier cases the contents are usually very thick with very little fluid in them, for the stomach secretes very little gastric juice in such cases. The particles of bread are big and very little digested; almost the same as when they were swallowed. There is some mucus in the contents. This is the most common type of cancerous stomach-contents, especially in the earlier stages. Certain types of contents of chronic anacid gastritis look exactly like this, and the diagnosis on the gross appearance will rest in such cases between the two. Another type of cancer stomach is thick contents, offensive in odor, coming out like molds from the stomach-tube. This is the type of cancerous pyloric obstruction. Coffee-ground-contents and grey contents, as mentioned before, are another type.

The Microscopic Appearance of Cancerous Stomach-Contents.—The picture shows the starch well digested in the Ewald test-breakfast. The iodine and potassium-iodide solution employed in staining the specimen shows the starch but faintly stained of a light violet color.* Large numbers of pavement, round, and cuboidal epithelial cells abound. Pus cells in considerable numbers are extremely uncommon in any stomach-contents. The writer saw one case where pus cells were in great abundance. Other signs did not point strongly towards cancer. The patient was operated, and the diagnosis of cancer was confirmed. The writer found, however, lately pus cells in abundance in a marked case of chronic gastritis. There are few yeast cells in cancer.

Sarcinæ ventriculi are often met with where the carcinoma invades the pyloric region. Sarcinæ ventriculi are a fungus that looks like bales of hay, and are characteristic of high-grade fermentation. It is an unmistakable sign of pyloric obstruction, benign or malignant. It was believed at one time, that sarcinæ always meant a benign stenosis. In fact, Oppler injected pure cultures of sarcinæ ventriculi into a carcinomatous stomach, and in twenty-four hours all the sarcinæ disappeared. The writer also believed in this doctrine. During the last two years, however, he has seen several unmistakable cases of cancer showing sarcinæ. The condition, as he found it out later, that determines the presence or absence of sarcinæ in pyloric obstruction, is not malignancy or benignity, but the presence or absence of free hydrochloric acid. Sarcinæ do not thrive in an anacid medium. They are therefore present in those cases of pyloric obstruction that show free hydrochloric acid and absent where

*Weinstein: The Macroscopic and Microscopic Appearances of Stomach-Contents. (*Journ. Amer. Med. Assoc.*, p. 1710, November 20th, 1909.)

there is no free hydrochloric acid. The writer saw, however, a few months ago one case of pyloric obstruction without free hydrochloric acid and still sarcinæ were present.

Another feature in the microscopical diagnosis of cancerous stomach-contents is the presence of a good deal of fat that has undergone lipolytic changes, fatty needles, and also remnants of different food products, such as milk, vegetable remnants, etc. Their presence is dependent on the impaired motility of the stomach, they having been left from a previous meal. The writer had one patient recently who was referred to his service at the Vanderbilt clinic from another clinic with the probable diagnosis of cancer of the stomach. That patient showed a marked cachexia, and gave a cancer-stomach history (except for the good appetite): tenderness over the stomach and the macroscopic and chemical examination of cancer. The writer found, however, the microscopic picture to be perfectly normal, and on further studying the case it was evident that the altered stomach-contents depended on chronic gastritis due to drink and absence of teeth, and that the patient suffered with disease of the coronary arteries that contributed largely to the patient's symptoms. Perfectly normal microscopically looking stomach-contents cannot be the seat of cancer.

Boas-Oppler Bacilli.—This is a long rod-shaped bacillus which often forms chains. When present in large numbers it is readily recognized and is diagnostic of cancer of the stomach. Only a few of them have no diagnostic significance whatsoever, and single specimens looking like Boas bacilli are met with in all kinds of stomach-contents. There is no need to stain them as they are readily demonstrated unstained. A magnification of about 600 diameters (6 or 7 Leitz) brings out all their features. As a rule, along with the Boas bacilli, a very rich flora of different other species is prevalent. In general, large numbers of micro-organisms are a feature in cancer of the stomach. Boas Oppler bacilli are not an early sign of cancer. The writer has never seen them in the early stages of cancer, and in general are not very often found. They are never seen in contents that contain free hydrochloric acid.

The presence of blood cannot be determined microscopically, for the blood-cells become digested by the stomach enzymes. Chemical tests only are of value to decide this question.

The Chemical Examination of Stomach-Contents.—Absence of free hydrochloric acid has been known for years to be an important feature in the diagnosis of cancer of the stomach. *Per se* it means nothing, for absence of free hydrochloric acid is a feature in diseases other than carcinoma, such as chronic gastritis, pernicious anemia; some few ulcers of the stomach are attended by an absence of free hydrochloric acid. Absence of free hydrochloric acid is very common in people who have no teeth and therefore do not masticate their food well. Chronic gastritis is the result of it and the cause of the absence of free hydrochloric acid.

Absence of free hydrochloric acid is met with in a large number of cases of Basedow's disease. While absence of free hydrochloric acid means very little *per se,* if taken, however, in conjunction with the cancer history, and the presence of pernicious anemia and Graves' disease ruled out by exclusion, the diagnosis of cancer of the stomach becomes very probable. Absence of free hydrochloric acid is an extremely important sign in the diagnosis of cancer of the stomach. It requires, however, considerable good judgment in its interpretation. A patient presents himself with a cancer history. He had always been in good health up to the present illness; was of good habits and never used alcohol habitually; has a good set of teeth to chew his food with. Pernicious anemia and Basedow's disease being ruled out, there is only one logical conclusion as to the cause of the loss of his free hydrochloric acid—namely, a carcinoma. If, however, this patient had been a sickly individual prior to the onset of his present illness, or if he had been a habitual drinker, or without teeth, the conclusion that the patient has a cancer in his stomach cannot be so readily reached; for the patient may have had an atrophy of his gastric mucosa prior to the onset of his present ailment, either through general debility or through drink and other faulty habits, or through faulty mastication, all of which are the most common causes of chronic gastritis or atrophy of the mucous membrane of the stomach.

The combined and total acidities play no part in the diagnosis of cancer of the stomach. Both of them may fluctuate within wide limits. The writer often meets physicians who are under the impression that the presence of lactic acid invariably means cancer. This is erroneous. Lactic acid is present in any condition that is attended by absence of free hydrochloric acid and impaired motility of the stomach. These conditions are mostly offered by carcinoma of the stomach. However, there are states other than carcinoma that fulfil these conditions. Where the motility is normal the lactic acid producing micro-organisms do not have much of a chance to cause their fermentation; where, however, the motility is impaired a favorable soil is prepared and lactic acid is elaborated. Lactic acid is absent in a good many cases of cancer of the stomach. It is much less constant than absence of free hydrochloric acid.

The starch digestion in cancer of the stomach, in contradistinction to normal stomach-contents, is complete, reaching the stage of achrodextrin and even maltose and dextrose. This has, however, no value in the diagnosis, for the perfect digestion depends on the lack of free hydrochloric acid and not on the cancer. Free hydrochloric acid checks the action of the ptyalin on starches. In absence of free hydrochloric acid the ptyalin digestion goes on uninterruptedly.

Occult Blood in the Stomach-Contents and Feces.—This is a very valuable sign. In order that the diagnosis of occult blood in stomach-contents be of value, we must be certain that the blood oozed out by itself and not as a result of trauma inflicted by the stomach-tube. In

the hands of an experienced operator there is very little fear of making that mistake. A few points how to secure stomach-contents easily, with the least gagging and irritation on the part of the patient, will not be amiss. The patient should be instructed to breathe during the manipulation; the stomach-tube is to be both thin in calibre (30 French) and have thin walls. Its end should be a closed one and the contents, if they do not come out readily by themselves, are to be aspirated. The extraction is to be done about fifty minutes after the ingestion of the Ewald test-breakfast, which is the height of digestion. With these precautions there need hardly be any straining on the part of the patient. Of course, if the contents are dark or grey in color, we can be absolutely certain that the bleeding was spontaneous and not inflicted by the tube.

By examining the feces for occult blood we avoid the possible source of error of trauma with the tube; but there are certain disadvantages. In the first place, it is much more unpleasant to handle feces than stomach-contents. The patient must be placed on an exclusive meat diet for three days, for meat contains traces of blood. Moreover, the blood may come from another part of the intestinal tract than the stomach. Bleeding from piles is very common with many people and may serve as a source of error. I prefer the examination of stomach-contents. In interpreting occult blood in stomach-contents or feces, other conditions that are likely to serve as a source of error should be kept in mind. These are: gastric ulcer, cirrhosis of the liver, pulmonary tuberculosis, cardiac affections, and blood from the teeth and nose that may be swallowed.

The motility of the stomach is an important factor in the diagnosis of gastric carcinoma. Of course, if the carcinoma is situated within the pyloric region, the cause for the disturbed motility is narrowing of the pyloric lumen. But even if the carcinoma is situated in any other part of the stomach, the motility is disturbed. The impaired motility is probably due, in these cases, either to a direct involvement of the muscularis, or to a toxic effect on the muscular movements of the stomach. The impaired motility of the stomach invaded by cancer is a very important help in the diagnosis of cancer of the stomach. It is present in a very large number of cases, though once in a while one does meet a case of cancer where the motility is good. This sign is of extreme importance, because the macroscopic appearance and chemistry of cancer of the stomach and chronic gastritis are so much alike, but in chronic gastritis the motility is usually very good. In speaking of the motility of the stomach the writer has employed one standard only—namely, a normal stomach must empty itself after a regular dinner in seven hours. Any stomach which contains food after seven hours is a stomach with impaired motility.*

*Weinstein: Atony of the Stomach. (*New York Med. Journ.*, August 20th and 27th, 1910.)

Carcinoma of the Pylorus.

Cancer of the pyloric region presents certain characteristic features which are different from cancer in other parts of the stomach, the reason being that with cancer in the pyloric region interference with the exit of food takes place. Cancer of the pylorus asserts itself much earlier than cancer of other parts of the stomach. It is much more easily diagnosed. True it is often very hard to differentiate it from benign pyloric obstruction, but a mistake of this order is one that hurts nobody, for both benign and malignant obstructions require surgery.

In the history of the patient with cancer of the pylorus, a prominent feature is vomiting. The vomiting is in large quantities, mostly late at night. The patient often vomits food that he ate the day before. There are, however, some individual cases that never vomit even with an almost complete occlusion of the pyloric outlet. The writer recalls one patient with a carcinoma of the pylorus, who never vomited once in the course of his disease up to his very death. He has on hand now a patient with benign pyloric obstruction, who has had his trouble for past seventeen years, and had gastro-enterostomy performed three times. He is now undergoing a fourth operation of the same nature for the closing up of the gastro-enterostomy orifice, and yet he never vomited spontaneously, except when he feels bad, and then he induces it himself with a finger in his mouth.

All the features enumerated under cancer of the body of the stomach hold good for cancer of the pylorus as well. The loss of flesh and strength in cancer of the pylorus is more rapid than in cancer of the body of the stomach, for on top of the loss of flesh and strength induced by the cancer, the system is suffering from starvation owing to the closure of the pylorus. Amongst the additional physical signs is dilatation of the stomach. The stomach dilates as a result of overfilling with food. Peristaltic movements of the stomach are an absolute sign of pyloric obstruction. The movements are from left to right in a wave-like fashion; the stomach stands up often not unlike a uterus in the state of parturition. Peristaltic movements are not an early sign, but rather a late sign in pyloric obstruction. It means a marked occlusion. They are characteristic and when seen once or twice cannot be mistaken. The following are the sources of error. In hour-glass contraction of the stomach the same movements are visible at times. In a thin subject with diastasis recti, normal peristaltic intestinal movements are at times mistaken by the inexperienced. Obstruction in some part of the intestinal tract often gives rise to movements in the intestine. To differentiate the latter two, it is only necessary to empty the stomach, when the movements cease provided they were in the stomach. For further evidence, a stagnation test on the stomach decides the point.

The acidity of the stomach in carcinoma of the pylorus is of no value

in diagnosis. While presence of free hydrochloric acid in gastric contents is uncommon in carcinoma of the body of the stomach, in pyloric carcinoma it is the most common thing; in fact, the acidity is very high in pyloric carcinoma. It is only in a small number of cases and in advanced cases that the hydrochloric acid disappears.

The macroscopic appearance of the stomach-contents in cancerous pyloric obstruction, in absence of free hydrochloric acid, is thick contents, coming out like molds from the stomach-tube with a foul, putrid odor. In presence of free hydrochloric acid, the contents are not thick; of a very sour and peculiarly sickening odor, which latter is due to the presence of sarcinæ. The contents separate into three layers: a layer of solid food at the bottom, another one of solids on top with a layer of liquid between the two. The top layer is food that has fermented, and hence is charged with gases, and through its lighter specific gravity is pushed up to the top. Articles of food of former meals are in abundance. We often siphon out a large quantity, even two quarts or more, from an Ewald test-breakfast.

Microscopically in acid cases we find sarcinæ ventriculi, while in anacid cases we find Boas-Oppler bacilli.

The crucial test for pyloric obstruction, whether benign or malignant, is the stagnation test. It is a test for the motility of the stomach, since the motility of the stomach is very much impaired. The patient is given a regular dinner in the evening, about 6 or 7 p. m., and the stomach is washed out on the following morning, the patient not to ingest anything between. If we find a large quantity of food—a pint or more—it is a case of pyloric obstruction. If there is no food there is no pyloric obstruction.

Differential Diagnosis of Malignant and Benign Pyloric Obstruction.— In benign pyloric obstruction the course of the disease is a much slower one than in malignant obstruction. The writer saw patients go on with benign pyloric obstruction for a good many years. In cancer the history is only of short duration, a few months. If a patient with a history of long-standing pyloric obstruction starts suddenly to lose strength with great rapidity, we must think of malignant degeneration. In benign obstructions we often get a history of previous pyloric or duodenal ulcer. Loss of flesh and strength is of no value in differentiation, for it is present in both. Given a pyloric obstruction without any free hydrochloric acid, it is undoubtedly cancerous. Presence of Boas-Oppler bacilli means malignancy. The tryptophan test has rendered the writer excellent service in this differentiation. In general, it is not of great practical importance to determine whether a pyloric obstruction is benign or malignant, for either condition requires an operation.

A variety of newer methods came into vogue of late to diagnose cancer of the stomach in its early stages. To these belong the Solomon test; the hemolytic test; Ascoli's meiostagmin reaction; the tryptophan test.

With the exception of the tryptophan test, the writer considers the others of not very much value, for they are very difficult of execution and, after all the hard work, there is nothing conclusive in them. Ascoli's meiostagmin reaction has been lauded more than any of them of late by various writers, but it is very difficult to carry it out, and its reaction is met with in conditions other than carcinoma. The ideal test for the early diagnosis of cancer of the stomach should be simple of execution, so as to make it accessible to the general practitioner, for it is he who sees the early cases.

The Author's Tryptophan Test.—The writer's experience has been very favorable with this test. He will briefly explain the rationale of this test, referring the reader for details to his original papers.* Emerson, while working about ten years ago on cancer, discovered that there is present within cancer an enzyme that is capable to split proteins into amino acids. It will be recalled that amino acids are the last stages of protein disintegration; that proteins before they reach that stage go through these gradations: (1) Proteins, (2) acid metaproteins, formerly called acid albuminates, (3) primary proteoses, (4) secondary proteoses, (5) peptones, (6) peptids, and (7) amino acids. In normal stomachs the digestion of proteins goes on as far as peptones, and no further. It is only in the intestines that the further cleavage of the proteins to amino acids is completed by the intestinal proteolytic enzymes. It occurred to Neubauer and Fischer to exploit Emerson's discovery for practical purposes, so as to determine the presence or absence of cancer of the stomach. For this purpose they employed glycyl-tryptophan. Glycyl-tryptophan is a synthetic chemical compound which is made up by chaining together two amino acids, glycin (also known as glycocoll) and tryptophan, into a more complex dipeptid. Glycyl-tryptophan does not respond to tests for tryptophan, unless the glycyl-tryptophan is split up by enzyme action into the original component parts glycocoll and tryptophan. In making the test Neubauer and Fischer added the glycyl-tryptophan to stomach-contents and incubated the mixture. If free tryptophan was demonstrated, it was proof that an enzyme was present within the mixture which liberated the tryptophan, and, since in normal stomach-contents no such an enzyme exists, the presence of an enzyme secreted by a cancer was the logical conclusion.

It occurred to the writer that tryptophan being a component part of almost all proteins, there was no need of adding any glycyl-tryptophan at all, and the use of the ordinary stomach-contents after incubation was sufficient. Later Warfield showed that glycyl-tryptophan, as employed by Neubauer and Fischer, was hydrolyzed by saliva, provided the saliva was not acid. This made the glycyl-tryptophan test no longer applicable, and hence the test, as employed by the writer, is the only one of service.

Why was tryptophan the amino acid of choice in these tests? Simply because tryptophan is the amino acid that may be demonstrated in the simplest and easiest manner. After having employed the tryptophan test for one and a half years, the writer finds it a valuable additional means of solving the mooted early diagnosis of cancer of the stomach. He had a number of cases where this test gave him the first important hint of the presence of cancer. He is not certain that a positive trytophan reaction means cancer, for there is one source of error,—namely, that duodenal-contents are likely to regurgitate into the stomach and in an anacid medium split the proteins into amino acids. It occurred to him lately that one of the methods of avoiding this source of error would be to keep the patient, after administering the test-meal, on the right side. Gravity would then prevent the duodenal-contents from regurgitating into the stomach.

The Value of the X-rays in the Diagnosis.—There has been a good deal of difference of opinion on that score. A good many radiographers are very enthusiastic about the merits of the x-rays in the diagnosis of cancer of the stomach. While recognizing fully the invaluable services of the x-rays in the diagnosis of the various afflictions of the whole digestive tube, from the esophagus to the rectum,—services that in a large number of cases are indispensable,—in the early diagnosis of cancer of the stomach, it is the writer's opinion, at present, that the radiograph does not offer us as yet much help.

The Gastroscope in the Diagnosis.—It is to be regretted that most of the work in this field has been done by laryngologists and not stomach men. It is evident that a man well versed in the pathology and sympto-matology of the diseases of the stomach could interpret a view in the stomach much better than a laryngologist. There are several drawbacks to gastroscopy. To have a gastroscope passed on oneself is not a very pleasant experience. With the gastroscope passed, one cannot inspect the whole stomach. The pyloric region is inaccessible. Fortunately tumors of the pylorus are quite readily detected by other means, chiefly by the impaired motility with which they are attended. With the gastroscope *in situ*, a carcinoma that is still covered with normal mucous membrane escapes our attention. Janeway and Green* have reported lately some good work in gastroscopy. They examined 14 cancers of the stomach. Of these they missed only 2, and those were situated in the pyloric region. In 6 out of 10 cases that involved the cardiac part of the stomach, they succeeded in removing through the gastroscope bits of tumor, and proved them by a microscopical examination to be carcinomatous.

Exploratory Laparotomy.

Surgeons advocate an exploratory laparotomy as the best means of diagnosing early carcinoma of the stomach. The writer heard one very prominent surgeon making the statement, that if a patient who has

*Surgery, Gynecology and Obstetrics, p. 245, September, 1911.

stomach trouble is treated medically for six weeks and does not get well, an exploratory laparotomy should be done. He recently heard another surgeon advocating the waiting period only four weeks. While surgeons, whose lot it is so often to operate on cancers in the late stages of the disease, which are beyond surgical help, cannot be blamed for their counsel, no man who treats large numbers of patients with stomach troubles can agree with such radical measures, as the surgeons suggest. There is a large number of people suffering with all kinds of stomach ailments, and whose cases do not yield to treatment, not only in six weeks, but even in a much longer time, and yet finally recover. Should the counsel of surgeons of promiscuous exploratory laparotomies be followed, probably 30 per cent. of humanity would have to submit to abdominal section. Moreover, patients are absolutely unwilling to undergo exploratory laparotomies, if the plain truth is told to them as to the real nature of the proposed operation. However, the best of us meet, from time to time, cases where a careful array of all our diagnostic symptoms, signs and laboratory methods are of no avail, some of them pointing to cancer and others against it. In a case like this we must at times resort to an exploratory laparotomy, and this should not be temporized too long, lest the exploratory laparotomy be equivalent to making a diagnosis at autopsy.

DUODENAL ALIMENTATION.

By WILLIAM GERRY MORGAN, M. D., of Washington, D. C.

A little over a year ago Einhorn* devised his method of duodenal feeding, the first time that food has ever been introduced into the body in sufficient quantity to sustain life indefinitely by any other way than through the stomach.

Certain conditions demand rest for the stomach. This has in the past been accomplished only by means entailing a partial starvation. It is generally admitted that about the only substances useful for the purposes of nutritive enemata, and which are absorbed perfectly, are saline and glucose solutions, and that the amount of these capable of being absorbed is far below the needs of the economy. So, while useful in tiding over emergencies and for a short length of time, rectal alimentation has always had its drawbacks.

Duodenal feeding, by short circuiting the stomach, gives it complete rest, at the same time furnishing the body with food of a sufficient caloric value by means rather closely simulating the normal ingress of food into the duodenum. Not only can weight be kept up, but a positive nitrogen balance be maintained, as shown by Einhorn and Rosenbloom,** with a slight gain in weight.

Einhorn's apparatus consists of a small gold bucket perforated by several small openings and capable of being taken apart for the purpose of cleaning; a rubber duodenal tube of small calibre leading to the bucket; a rubber petcock and the feeding table, an ingenious arrangement which rests over the glass of nourishment so that the food may be drawn up through one tube into a glass syringe, and by a manipulation of petcocks be forced slowly into the tube connecting with the duodenal tube, without disconnecting the syringe.

The technique is as follows: At night the patient, with the aid of water, swallows the bucket and the tube until the first line on the tube is at the teeth, which indicates that the bucket has reached the stomach. During the night the bucket will ordinarily pass into the duodenum. The second line on the tube is supposed to be at the teeth when the bucket it at the pylorus, and when the third mark has reached the teeth the end of the tube is probably *in situ* well down the duodenum. When this is so, the tube is allowed to remain in place constantly during the entire course of duodenal alimentation. After the first twenty-four hours, the

patient will become so used to the feeling of the tube that it will cease to be even very disagreeable.

How can we tell that the tube is through the pylorus? By slight traction a resistance is felt if it is in the duodenum; aspiration through the tube with a glass syringe brings typical, golden yellow duodenal juice and not gastric juice; lastly, if the patient be given a glassful of water, colored by several drops of methylene-blue, to drink, and if aspiration is immediately performed, the solution will not be returned through the tube if the end is in the duodenum, as it would were it still in the stomach.

Feeding is given at two-hour-intervals during the day, and the food, which has been found most satisfactory, is a mixture of milk, raw egg and sugar of milk. The amount which should be given is from 240 c.cm. to 300 c.cm. of milk, one raw egg and 15 grm. of sugar of milk. It will be necessary, however, to start with much smaller quantities, 100 c.cm., and work up to the full amount as soon as possible.

It is important that the feedings simulate nature's method as much as possible, and to this end the food must be heated and strained, and then given slowly through the tube. Under ordinary circumstances the stomach performs, among its other duties, the function of withholding food from the duodenum until of a correct temperature. Too hot foods are cooled and cold foods are not expelled from the stomach until they are heated to blood-heat. It is important to bear this in mind in undertaking duodenal feeding, as the duodenum is most sensitive to variations in temperature, reacting to such shocks, as well as to too rapid administration of food, by causing feelings of nausea, discomfort, restlessness, clammy perspiration, etc.

After feeding, a cleansing syringe full of warm water should be injected through the tube, and this followed by one of air and the petcock closed. Failure to keep the tube properly clean will result in its becoming entirely blocked by a tough coagulum of milk and egg, which will necessitate its withdrawal to clean.

As previously reported,* the first 2 cases which the writer treated by the duodenal method of feeding, according to Einhorn's method, failed to take a sufficient quantity at a feeding without producing untoward symptoms of nausea and distress; therefore, he has, in all later cases, employed the modification which afterward succeeded in these two. Instead of the syringe, he makes use of gravity and the drop-method as in giving the Murphy salt solution. The duodenal tube is connected to a tube leading from a porcelain pint irrigating jar, and the flow is regulated so that the 300 c.cm. used at a feeding takes about twenty-five to forty minutes to pass through. The jar may be kept warm by standing in warm water.

During the period of duodenal feeding, in order that enough fluid may

*Morgan (*Medical Record*, March 4th, 1911).

be supplied the body, one pint of normal salt solution is best given every day by the drop-method per rectum.

In addition to the cases previously reported, the writer has used duodenal alimentation in a number of cases, and has found it a most satisfactory way of giving the stomach rest; and he regards it as a distinct addition to our armamentarium in the treatment of gastric ulcer. It is not essential that it be employed in all cases of ulcer; hence, in the majority of his patients he has not found it necessary to resort to it; nevertheless, he will append synopses of the histories of a few patients treated by this method.

Two cases have had gastro-enterostomy performed after their condition had been materially improved by duodenal alimentation. Miss M. T. D., *æt.* thirty-four, gave a history of nine years' duration. Her chief complaints were pain and tenderness in the left epigastrium and frequent headaches. When standing long on her feet the discomfort would be intense. She had no nausea or vomiting. On examination her gall-bladder was distinctly palpable and slightly tender but not distended. The right kidney was prolapsed to the second degree. A spot of some tenderness was found on deepest pressure $\frac{1}{2}$ inch below and 1 inch to the left of the ensiform. Splashing sound extended from the ensiform to the lower border of the navel. Examination of the test-meal showed slight hypersecretion with free acid 44 and total 64. Occult blood was not present in the stool at first, and diagnosis was not clear for a couple of weeks; then occult blood was present and the thread-test was positive. Pain became worse and was accompanied by vomiting in spite of rest and treatment for two weeks, so the writer started on duodenal feeding. She improved considerably, and later a gastro-enterostomy was performed and ulcers found in both the stomach and duodenum. Her condition before the operation was undoubtedly much improved by the duodenal feeding.

Mrs. E. M. came to the writer with symptoms of recurrence of ulcer which had apparently been cured by treatment a year before. Her weight was only 98 lb., and she had severe pain and marked tenderness in the epigastrium. Blood was present in the stool. Operation was decided upon, but later we decided to try first duodenal alimentation. The tube was kept *in situ* for eighteen days. Her symptoms were entirely relieved, and her weight continued to go up until several months later it had reached 116 lb. Ulcer symptoms later returned, and she was operated upon by Dr. Howard Kelly, who found several healed ulcers in the stomach and an open ulcer in the duodenum. Her condition was wonderfully improved by the tube and she was better able to stand operation. Then again, it is more than possible that the tube actually healed the ulceration that was present at the time, as witnessed by the scars found, and that the later symptoms were due to the duodenal ulcer which had developed since.

Mrs. H. C. M. had symptoms of two months' duration. She had lost 7 lb. in weight. Her most troublesome symptoms were a gnawing sensation in the stomach about three hours after meals, and in the early morning, and pyrosis at the same time lasting until she either ate, took soda or belched. She had some pain below the ensiform. Examination showed no tender spots, and the stool was negative for occult blood. The right kidney was palpable to the first degree. Splashing sound was obtained over the whole upper abdomen from the ensiform to the lower border of the navel. Free HCL 34, total acid 48. She was put on a general reconstructive treatment. She improved somewhat and went away to the country; but while there her symptoms became more severe; and three months after the first examination the thread-test was markedly positive and she was put upon duodenal feeding. This was followed by complete relief from her symptoms, which has continued, and the thread-test has become negative.

The writer has now under treatment Mrs. G. K. H. who has in the past been treated by Dr. Bowen for ulcer of the stomach. He referred her to the writer when symptoms recurred, and feeding through the tube was begun. The tube was withdrawn several days ago and she is doing very well. Occult blood has disappeared from the stool.

Another patient, Mrs. M. R., has been completely relieved from her symptoms, and as far as can be determined her ulcer is cured. Occasionally the writer has employed duodenal alimentation in conditions other than ulcer. Mr. G. K. K., who had cancer, as shown at operation, involving a large part of the stomach, was relieved of a feeling of closing-up of the throat and marked dysphagia, and his strength kept up for a time by feeding through the duodenal tube. It was necessary to try twice before the tube could be made to pass the pylorus.

Mrs. D. T. D. had severe tic douloureux which seemed to be markedly influenced by conditions in her gastro-intestinal tract. She was emaciated and had a marked visceroptosis and ischochymia. The lower border of the stomach was three fingers' breadth below the navel. She took the tube for twenty-one days and again for fifteen days. While previous to the duodenal feeding she had improved very little, afterward the gain was striking. The tic improved while the tube was still *in situ*, and it has not troubled her since. She has gained 34 lb. in weight, and her organs are decidedly nearer the normal position than before.

Miss R. A. had enteroptosis for seven years, and had been treated by many physicians. She was a much emaciated girl with a train of nervous and dyspeptic symptoms. She did not do so very well under the rest cure with forced feeding, but made rapid strides toward health after taking a course of duodenal feeding, and has gained 40 lb. with corresponding feeling of well-being.

In closing I would like to repeat that duodenal alimentation is decidedly valuable. All acid dyspepsia symptoms have usually disappeared

within five days after starting the feeding. In ulcers at the pylorus it should be tried before resort to gastro-enterostomy; and if the latter is found necessary the patient will be in better condition to stand operation. Ulcers on the lesser curvature will be benefited by the duodenal feeding more than by a gastro-enterostomy if some distance from the pylorus. Whether or not this method of feeding should be instituted in an ulcer case depends on the severity of the symptoms and the position of the ulcer.

In addition to its usefulness in ulcer, there is another field for its employment in certain selected cases of enteroptosis and ischochymia as in those heretofore mentioned.

The Rochambeau.

THE HUMAN INTESTINAL PARASITES COMMON IN THE UNITED STATES.*

By CHARLES C. BASS, M. D., of New Orleans,
Assistant Professor of Tropical Medicine and Hygiene in Tulane University,
New Orleans.

In this paper it is intended to discuss briefly the intestinal worms commonly infecting man in the United States. Space permits statement of the important facts only, and it is not possible, in the limited space at the writer's disposal, to explain or to give authority for the statements made.

Necator americanus (New World Hookworm).—The term "hookworm disease" is not a good one. The number of worms infecting a given patient may be anywhere from one up to a sufficient number to kill the patient, which may require several thousand. A small number of worms may not produce any variation, demonstrable by our present methods, from the normal. A slightly larger number may give rise to very slight symptoms, not recognizable by the layman, while a still larger number may produce severe symptoms. It is more appropriate, therefore, to employ the term "hookworm infection."

The natural habitat of the worm is the duodenum and jejunum, and it is seldom, if ever, found elsewhere. The adult worm hangs to the mucous membrane by sucking into its mouth a plug of the membrane. This is denuded of its epithelial cells by the action of some cutting plates located deep in the mouth of the worm. The tissue thus denuded furnishes a small amount of blood. Bleeding is further caused by the interference with coagulation, one of the natural remedies against hemorrhage, by a secretion with which Nature has provided the worm for this purpose, just as she has other small blood-sucking animals. After feeding on a particular spot for hours, the worm moves to another spot near-by and feeds as before. The site of the bite, denuded of its epithelium and poisoned with the coagulation inhibiting secretion, continues to bleed for hours and possibly days after the worm moves to another spot to feed. There also occurs bleeding into the tissues giving rise to hemorrhagic spots from the size of a pin's head to one-fourth inch or more in diameter, each with its central ulcer. Depending upon infection or possibly digestion, these pin-point ulcers may grow very much larger. They are usually located in the duodenum and give rise to the usual symptoms and sequelæ of duodenal ulcer. The writer once saw such an ulcer, due to hookworm infection, located just below and extending into

the pylorus, as a result of which the patient starved and bled to death. The amount of blood necessary to feed a worm three-eighths of an inch long and not thicker than an ordinary brass pin must indeed be very small. It is to be remembered, however, that this is only a small part of all the blood lost by the patient to each worm. The continued hemorrhage from each bite is no doubt much greater than the amount consumed by the worm. The feces of patients infected with many hookworms always give a strong reaction for blood. The hemorrhage into the tissues is also a loss of blood to the patient. Whenever blood-cells get out of the vessels into the tissues from any cause, they cannot return to the circulation until they degenerate and disintegrate. If we add together the blood given by the patient, in the three ways mentioned, to each worm, it will amount probably to no less than one to three or more drops in twenty-four hours. The loss of a few hundred or a few thousand drops of blood occasionally would have little or no effect on an otherwise normal individual; but, if such loss is continued daily for months and years, anemia will surely result. It is only necessary to mention the severe anemia that results from long continued small hemorrhages, e. g., hemorrhoids, etc., to point out the probable results in hookworm infection. This anemia will affect the patient dependent, no doubt, upon many factors. It is probable that one individual can make and restore to his circulation the lacking blood better and more rapidly than another one can. The degree of anemia is important. If the patient is a child, and the growing organs and tissues are fed with blood containing less than, say 50 per cent. of the normal nutritive material, the growth of the organs and tissues is stunted. This applies to the central nervous system also. If the infection is great enough, there is interference with the mental development as well as the physical. The hookworm patient learns slowly. When the muscles of the body are insufficiently nourished, their strength and working capacity are likewise impaired, and the patient feels weak and unable to work. This is the explanation of the earlier idea that the infection led to laziness. These patients are not really lazy, but they are weak and sick, although they do not know it. It does not often occur in this country that the infection is severe enough directly to cause death. There must, however, be many deaths due indirectly to the infection. An individual whose blood and vitality is reduced one-third, one-half, or three-fourths, as is not at all uncommon in this country, has correspondingly reduced ability to resist and recover from other intercurrent diseases like pneumonia, typhoid, tuberculosis, nephritis, etc. Death in such an instance would not likely be attributed to the results of the worm infection which, however, may have been largely responsible.

The worms lay large numbers of eggs which are mixed and pass out with the feces. These cannot hatch in the intestinal canal. They require oxygen. An infection does not, therefore, increase itself except from without, and that only indirectly. In the presence of the oxygen of the

air and under favorable conditions of temperature and shade, rhabditi-
form larvæ begin to hatch out in about twenty-four hours. Only the
eggs near the surface exposed to the air hatch, but if the feces are mixed
with earth, sand, or water, so as to aerate all the eggs, most of them
promptly hatch. These rhabditiform larvæ feed on the feces, but, after
five days or more, cast their skin. Instead of crawling out of the skin,
the mouth-end is sealed up with the larva still inside. They are now
spoken of as encysted or encapsulated, and are now infectious. Up to
this stage they were harmless. They do not take food in this stage, and
are very resistant to harmful agents such as antiseptics, heat and cold,
etc., though they were formerly very susceptible to such agencies. As a
matter of fact, the rhabditiform non-encysted larvæ are so easily de-
stroyed that comparatively only a few reach the infectious stage. It is
only during a long rainy spell in the warm summer months that conditions
are favorable enough for the larvæ to reach this stage of development
in great numbers out in the open. It may sometimes happen in damp
mines, around ditches, low damp places, etc., that conditions are such as
to permit their development. Warm, rainy spells being very favorable
for the development of the larvæ, hookworm infection is most prevalent
in the section of the United States in which such seasons occur most fre-
quently, viz., the South. In Porto Rico and parts of Mexico, Central
and South America, blessed or cursed with a rainy season of weeks' or
months' duration, this infection is much more common than in the United
States.

The encysted larvæ have the habit of crawling up along the sides of
blades of grass or anything else they can find; or they remain in the
mud and water in which they have developed. They lie quiet and dor-
mant until they are disturbed, when they run about with great activity.
If a barefooted child comes along and gets mud and water containing
encysted larvæ on his feet or any other part of the body, they promptly
penetrate the skin which they can do in a very few minutes. Their
wonderful ability to plow through tissue leads them sooner or later to
enter a blood- or lymph-vessel.

The infection and, probably, toxins, and secondary bacterial invaders
carried into the skin, set up itching, burning and inflammation. Be-
cause the infected material collects chiefly between the toes, it is called
toe-itch, ground-itch, or sometimes dew poison, because infection can
often occur from walking in dew-covered grass barefooted. They may
get to the foot through leaky shoes or it may be possible for them to
pass through the leather of a wet shoe. The writer has demonstrated
that they can pass through leather the thickness of a lady's glove. The ground-
itch runs a course of vesicles, pustules, crusts and exfoliation in about eight
to twelve days. Children are more likely to be infected, and their infection
is usually greater because they go barefooted more than adults. It is
possible for infection by mouth to occur from drinking water or raw
food, but it is of minor importance.

After the larvæ reach the blood-stream, they are carried through the right heart to the lungs where they stop, because they cannot pass through the smallest capillaries. Bringing into play their great ability to bore through tissue, they sooner or later pass into the bronchial tubes along which they are carried to be finally coughed up and either spat out, or swallowed. The larvæ that are thus swallowed pass through the stomach; but, when they reach the alkaline duodenum and jejunum, their natural habitat, they penetrate the gut-wall. A blood-cyst forms around the worm which after a few days develops the adult form of the buccal cavity enabling it to hold on to the mucous membrane. Then it comes out, hangs to the mucous membrane, and develops to an adult parasite in about seven weeks from the time of the original infection. The duration of life hereafter is probably from five to ten years.

Anemia and the results of anemia are present in all severe infections. It is often too little to be demonstrated in mild infections. Eosinophilia, from 4 to 30 per cent., is generally present but occasionally absent. Those who wait to recognize anemia or eosinophilia before examining the stools will miss many cases of hookworm infection.

The diagnosis depends upon proper microscopic examination of the stools for the characteristic egg, and will be taken up later with the other worm infections.

As regards treatment, thymol is a specific. It is given for its direct action on the worm, and its absorption is not desirable; therefore, it should not be brought into solution by oils, alcohol, large quantities of water (1-1100), etc. Thymol is conveniently given in large gelatine capsules mixed with an equal quantity of sugar of milk. The worms are protected by considerable mucus, and food which should be removed by a saline purgative. Sodium sulphate is preferred. The routine directions for an adult are:—

```
No supper
Sodium sulphate. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .10 p. m.
Thymol gr. xx. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 6 a. m.
Thymol gr. xx. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 7 a. m.
Thymol gr. xx. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 8 a. m.
Sodium sulphate. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .10 a. m.
```

Allow no food until the last dose of salts acts well, as this is for the purpose of getting rid of the thymol after it has passed below the feeding ground of the worms.

The course of thymol as given before should be repeated about once a week until no more eggs are present in the stools. This requires from one to eight courses.

Strongyloides Intestinalis (Cochin China Diarrhea Worm).—The adult parasite lives in the duodenum and jejunum, usually buried in the mucous membrane. The eggs are laid in the glands of Lieberkuehn where they hatch and rhabditiform larvæ only are to be seen in the feces. They may sometimes develop to the infectious stage in the intestine, but

seldom do so until they are passed and exposed to the air. After several hours a part of the larvæ becomes filariform and is then able to penetrate the skin and infect like hookworm larvæ do. They pass through the lungs in the same manner and may be found in the sputum of infected patients. After a patient is once infected he continues to be reinfected by the larvæ that become infectious around the anus and enter the skin. If such a patient is confined to the bed with a severe injury, or otherwise, and is not kept clean of his feces, fatal infection may result in about six to eight weeks.

The symptoms are usually chronic diarrhea and eosinophilia, dependent upon the severity of the infection. These symptoms may be absent.

There is no treatment that will destroy the adult worms. They would finally die if reinfection could be prevented. This can be accomplished theoretically by continued administrations of salol, which kills the rhabditiform larvæ, as pointed out by Eustis. Frequent purgatives lessen the chances of larvæ becoming infectious in the canal, and scrupulous cleanliness after defecation is absolutely essential. I have never seen a case cured. The class of patients infected and the habits which permit the occurrence of the original infection make it improbable that cures may be accomplished in this way.

Ascaris Lumbricoides (Common Round-Worm).—Infection is by swallowing the eggs or possibly the larvæ.

The habitat of the worms is the small intestine.

No diagnostic symptoms can be given. Children are infected chiefly; adults seldom. Changeable abdominal tumors and even intestinal obstruction may result from balls of these worms and convulsions from the same source. The worms occasionally migrate to the common bile-duct, throat and nose, giving rise to very unpleasant symptoms.

The treatment is specific. Calomel and santonin administered to an empty gastro-intestinal canal seldom require repetition.

Trichuria Trichuris (Whip-Worm).—This worm infects children chiefly, and is strictly a filth infection generally acquired by mouth-swallowing larvæ or embryos. The adult worm, about two inches long, buries its head and neck in the mucous membrane of the gut in the region of the cecum for an inch or more. The larger tail half lies in the lumen of the gut.

No symptoms can be attributed to this worm, except very rare cases of appendicitis due to the migration of a worm into the appendix or a slight eosinophilia when the number of worms is large. It is hardly to be believed, however, that the worm is harmless if we consider the manner in which it attacks the mucus membrane.

No treatment known to the author can remove the parasites. Scrupulous cleanliness prevents reinfection and the old worms will finally die out.

Oxyuris Vermicularis (Seat-Worm, Pin-Worm).—This worm infects

the rectum, anus, and in girls, sometimes the vulva and vagina. The eggs are deposited chiefly in the folds of the anus and vulva where they hatch. Most of the larvæ are lost, but a few enter the cavities and perpetuate the infection.

The symptoms are itching and irritation of vulva, anus, and rectum, especially while the patient is asleep and quiet, during which time the worms crawl out to deposit their eggs. The irritation may in turn cause restlessness during sleep.

Enemas of very bitter solutions like infusion of quassia, or strong solution of quinine bisulphate, or of such drugs as sodium chloride, or glycerine, are usually successful in removing the adult parasites. Scrupulous cleanliness prevents the larvæ from hatching and perpetuating the infection.

Tapeworms.—Practically only two varieties of tapeworms occur in this country,—*taenia saginata* and *hymenolepis nana.* Rarely *T. solium* and *dibothriocephalus latus* may be found.

Taenia Saginata.—Infection occurs only from eating beef, especially the tongue and muscles of mastication which oftenest contain the cysticercus. The cow is infected by eating food or drinking water contaminated with the embryos either directly or indirectly from man. The cow is an obligatory intermediary host. Thorough cooking kills the cysticercus.

The worm sometimes is 30 or 40 ft. long and may weigh half a pound or more. This mass of material sometimes gives rise to changeable abdominal tumors. Segments are broken off from time to time and may be found in the stools. The health of the patient is usually not impaired. Anemia may occur always accompanied by eosinophilia. Eosinophilia is not a pathognomonic symptom in the absence of anemia.

Hymenolepis nana infects the small intestine and may be present in enormous numbers. The worm is armed with a rostellum of hooklets, and its presence gives rise to anemia and eosinophilia. Over 50 per cent. of the cases known to the author gave a history of having had convulsions in childhood. Children are chiefly infected. It is probable that the infection occurs directly from filthy habits and that no intermediate host is required. The rat is considered a probable intermediary host, but Stiles in a recent conversation told the writer he very much doubts this.

Male fern is sufficiently specific to be successful in removing many of the tapeworms, provided the other essential part of the treatment is carried out. The writer refers to preliminary starvation. The worm does not feed on the tissues of the host, and absolute fasting preceded by a purgative will cause the worm or worms to quit the host in a few days. Drugs are thus not necessary, but help in ridding the patient of the worms.

The diagnosis of all intestinal worm infections, as a rule, may be made by finding the worms in the stools. The only way to determine

the presence or absence of such infection with certainty is by microscopic examination of the feces. The eggs of each of the worms mentioned are characteristic and very easy to identify by one familiar with them.

For microscopic examination a specimen, only a dram or two, of the natural feces is required. No preliminary treatment is required. A particle no larger than a match-head is stirred in two or three drops of water on a slide and examined for eggs or larvæ with the low-power lens. Eggs or larvæ will be found on every such slide if heavy infection exists. It is necessary properly to concentrate the eggs by means of the centrifuge, if ordinary examination prove negative. Examination of several slides prepared as before suggested may reduce the chance of missing the few eggs in a mild infection, but it is not so dependable as one slide from the centrifuge specimen.

In the method last mentioned, the feces are diluted with water, strained through gauze, and centrifuged just long enough to throw eggs to the bottom of the tube. A longer time defeats the purpose by throwing down the other material of the feces. The supernatant fluid may be poured off, water added, the tube shaken, and centrifuged again. Two or three washings like this get rid of most of the feces except particles about the size and weight of worm eggs. Most of the feces can thus be discarded and the eggs, if present, very much concentrated. It is not practical in this short paper to describe and differentiate the eggs of the different intestinal parasites discussed, although this is very simple when they have been once seen.

741 Carondelet Street.

SOME GENERAL REMARKS ON THE TREATMENT OF GASTRIC DISEASES.*

By Jacob Kaufmann, M. D., of New York,

Professor of Clinical Medicine in the College of Physicians and Surgeons, Columbia University; Attending Physician to the German Hospital.

Every plan of treatment must be based upon a correct diagnosis and upon a proper understanding of the nature of the disorder and of the causes which provoke it. In discussing the treatment of gastric disturbances it seems, therefore, advisable to give a short sketch of the present views on the pathology of the stomach. A few general remarks are all the more necessary, as the teaching regarding diagnosis and pathology of the stomach has several times undergone changes since Kussmaul in 1867 introduced the stomach-tube and used it to study gastric function and gastric disorders. This change of view has usually been due to the overestimation of new findings, and since another change of view is taking place at present, it is timely to take stock and see whether the new findings are being given their proper value.

First, let me emphasize the necessity and importance of systematic and thorough examinations of the stomach-contents; they are essential both to gain accurate knowledge of the condition of the stomach and to assist us in directing proper treatment.

It is sometimes said that the amount of information gained by gastric analysis is small and that one is easily led to an erroneous diagnosis by overestimating its value in comparison to other findings. In this respect, however, there is no difference between gastric analysis and other methods of examination. With any method of examination, findings are of value only when taken in connection with the history of the case and all other clinical symptoms, and, furthermore, when the findings are rightly interpreted. In case certain findings lead to an erroneous diagnosis, we must not depreciate the method of examination, when in reality a faulty interpretation is the trouble. There is an abundance of proof of faulty interpretation of gastric analyses; a perusal of textbooks and current literature will convince any critical reader that grave errors are often committed. This fact, however, should not make us desist from examining gastric contents, for a gastric analysis, when properly performed and interpreted, yields valuable information. Unquestionably the further de-

velopment of gastric analysis will clear up features in the derangement of gastric function, which at present are only poorly understood.

Progress in correct interpretation has principally been made in one direction, that is, regarding the relationship of motor and secretory disturbances, although there, too, much confusion still exists. For many years the chemistry of gastric digestion was the main object of examination, and abnormal findings were too readily attributed to derangements of the secretory function. Although the first and most important contributions to our knowledge of secretory disorders came from Kussmaul's clinic, Kussmaul himself and his pupils always pointed to the greater rôle which the motor function plays in the pathology of the stomach. It was a long time, however, before most investigators could be convinced that even those conditions, which appear to be entirely due to faulty secretion, are to a great extent the result of motor disorders. For example, the clinical picture of continuous hypersecretion, formerly described by many as a pure secretory disturbance, is now generally considered as invariably connected with impaired motility and to a certain degree caused by the latter. In my opinion, what nowadays is called alimentary hypersecretion is also wrongly interpreted as being mainly a derangement of secretion. Granting that there is an increased glandular activity, nevertheless the writer believes that the presence of the large quantities of fluid found in such cases can only be explained by a concomitant motor disturbance, pylorospasm, or more frequently gastric atony, which allows this accumulation in the stomach.

The proper understanding of some of these conditions has been greatly improved by investigations on the nature of gastric peristalsis and the activity of the pyloric part of the stomach; notably, Cannon's work, which taught us that the rhythmic movement of the pyloric antrum, and with it the evacuation of the stomach, is regulated by the action of hydrochloric acid.

It must be said, however, that a defect in the secretion of hydrochloric acid does not necessarily upset the mechanism of the outlet of the stomach, as is shown in cases of achylia with unimpaired motility. While this and other points have still to be cleared up, I believe that prolonged and increased secretion by irritating the duodenum may cause pylorospasm, and, by thus interfering with the evacuation of the organ, lead to the accumulation of the secretion. In this way the clinical picture known as continuous hypersecretion and gastrosuccorrhea is developed. The same picture of retention of large quantities of secretion is produced when pylorospasm is the result of some other cause than primarily increased glandular activity; for example, when it is the result of the irritating effect of perigastritis or adhesions. It is obvious how much the proper understanding of the development of such a condition must influence our plan of treatment.

Whenever the secretory disturbance is the primary factor, we should

try to remedy it by eliminating its causes: faulty habits, chronic intoxications, etc. If we do not succeed, or when from the beginning the motor disorder is the more important part, we should attempt to break the vicious circle by improving the evacuation of the stomach. When we are unable to accomplish this by medical means, we must resort to surgery.

Operative treatment, however, should never be undertaken without at the same time using every effort to reduce gastric secretion to its normal limits. We must keep in mind that the gastric function is a complex mechanism; that one of its components cannot be disturbed without soon affecting another; that a motor disorder may upset secretion and vice versa; and that both in turn may derange evacuation and absorption.

To further illustrate the great therapeutic value of reading correctly gastric analysis, I mention those cases of hyperacidity, in which the high degree of acidity is the result of hypermotility. The fast evacuation of the stomach brings about a high percentage of acids in the comparatively small amount of remaining contents, while the total quantity of secretion may have been small. Cohnheim, of Heidelberg, suggested lately that in such cases the administration of hydrochloric acid proves helpful by activating the lacking pyloric movements and by thus delaying the evacuation of the stomach—apparently a paradoxical proceeding, yet well supported by physiological facts.

Aside from the correct interpretation of disorders of the gastric function, we have to consider their pathological meaning. Here again we meet with repeatedly changing views.

When gastric contents were first studied, the mistake was frequently made of designating as a disease every change of gastric function elucidated by these methods. Up to the present time, textbooks describe achylia gastrica, hyperacidity, hypersecretion, etc., as diseases *per se*. These and other functional disorders may be of independent character, but as a rule they are only symptoms of a pathological condition, either of the stomach proper or of some other organ, or they are manifestations of systemic derangements. It is therefore not enough to examine merely the gastric contents, for gastric analysis alone rarely permits a complete diagnosis to be made, but we must consider every other symptom and the history of the case before we can give the gastric disorder its proper place in the clinical picture.

Gastric disorders are found in many different conditions, and they are provoked by numerous causes. In spite of all that is at present said to the contrary, the first place should be given to those disturbances which are the result of pathological changes of the stomach proper. The stomach is constantly subjected to insults, which tend to disease by direct harmful action upon the viscus. Faulty habits in eating, indiscriminate selection of food, abuse of alcohol, tobacco and the like, create gastritis mucosa, gastrititis acida and other organic changes, and with them all the different disorders of the gastric function.

On the other hand, we must bear in mind that the stomach more frequently, perhaps, than any other organ, is easily upset by derangements in other parts of the body. In trying to establish a successful treatment, it is therefore not sufficient to determine the condition of the stomach proper, but it is necessary to make a complete investigation of the system in order to find out whether we are dealing with a primary local disease or whether the gastric disturbances are only secondary in nature and caused by diseases in other organs. We have to consider here functional and organic derangements of the nervous system, diseases of the blood, metabolic disturbances, acute and chronic infections and intoxications, diseases of the circulatory system, diseases of the kidneys, of the liver, of the pancreas, of the intestines, and of the pelvic organs, and their activity under pathological as well as under physiological conditions. We know that distinct gastric disturbances arise with menstruation, pregnancy, and the menopause. This short summary covers a very large field and shows that the physician, who undertakes to treat gastric disorders, must be thoroughly familiar with medicine in all its aspects.

The occurrence of secondary gastric diseases has long been understood, as is seen in writings of older clinicians. When the writer first listened to lectures on gastric diseases at Kussmaul's clinic about thirty years ago, his teacher always laid great stress upon elucidating the various primary factors in cases with secondary gastric disturbances.

Of late, one special group of secondary gastric disorders has aroused a great deal of attention, that is, disorders caused by chronic appendicitis, diseases of the gall-bladder and the pancreas. Undoubtedly gastric disturbances are in certain cases brought on by reflex action from a diseased appendix or gall-bladder, and surgical interference may prove very helpful in the treatment of such conditions. The writer has no intention whatsoever of disputing such occurrences. In an article,* published eight years ago, he was one of the first to discuss the frequent connection of gallstones and gastric hyperacidity. But the frequency of such occurrences is greatly overrated at present, and too much importance is given to this special etiological factor at the cost of others which are well known as the provokers of gastric disorders. If we wish to believe all that is at present claimed, the large majority of all gastric disturbances has to be attributed to appendicitis, gall-bladder trouble, etc. Even gastric ulcer is not considered a primary disease of the stomach, but only secondary to chronic appendicitis and the like. Accordingly, some surgeons counsel against performing gastro-enterostomy, once highly praised as the only rational treatment in gastric ulcer, and propose appendectomy or cholecystectomy as the most reliable cure of the tendency to pylorospasm, the dominating factor in many ulcer cases.

The difficulty is that with the clinical picture clearly pointing to gastric ulcer, it is not at once evident from which other abdominal organ the

*American Medicine, Vol. VI, 1903.

reflex disturbance originates. If, for example, the diagnosis of chronic appendicitis is, in such cases, merely based on that most untrustworthy symptom—tenderness over McBurney's point—it often leads to the removal of an innocent organ in no way connected with the gastric symptoms. So it is with many operations for assumed gall-bladder trouble. The frequent negative results of operations, performed under such indications, has brought forward the advice to examine, at the time of operation, all abdominal organs and correct every abnormality, lest the obvious may not be the real cause of the symptoms. This somewhat summary proceeding has certainly the advantage of sparing the patient the performance of a second, third or fourth laparotomy, so often undertaken in the vain effort to find the real culprit.

The search is made on the basis of wrong reasoning. Because in certain cases gastric disorders are provoked by appendicitis or gall-bladder troubles, one is not justified in assuming that almost all gastric disturbances are due to such reflex action. While it is justly claimed that gastric analysis is of value, only when properly interpreted and when taken in connection with the history and with all other clinical symptoms, we must ask the same for the valuation of anatomical findings gained at operations. The causal connection between anatomical findings and clinical manifestations must be demonstrated particularly by the further development of the case. The mere fact, that at operation the appendix or other organs are found diseased, does not prove that these changes are the cause of the gastric disturbances. That they are very often not the cause is amply demonstrated by the frequent failure of operative treatment to prevent the recurrence of the original gastric disturbance. Not a week passes that the writer does not see patients, who on examination present the scar of one, two or more laparotomies performed for the very purpose of curing the gastric ailments for which they are still seeking relief. The writer is convinced that others meet with the same experience. Such patients continue to suffer for the very good reason that the operation did not remove the cause of their trouble as was promised. This applies not only to the numerous instances, where on account of an erroneous diagnosis the assumed anatomical changes were not present and no beneficial result could be expected, but also to those cases where anatomical alterations were actually found. In many cases of the latter group, the real causes of the gastric symptoms are chronic colitis, hepatitis, cirrhosis of the liver and other organic diseases of different abdominal organs, which are not touched at all by the operation. In another group of cases, organic changes of the appendix, etc., have less harmful influence upon the gastric function than have constitutional derangements, faulty habits or some other of the aforementioned etiological factors. These also remain unchanged by the operation. If, for example, the patient happens to be a neurotic and eventually addicted to faulty habits, he will have his gastric ailment after the operation the same as he had it before.

The increasing number of unnecessary and unsuccessful operations makes the writer dwell upon this point, and he considers it timely to protest against a proceeding which has become too common, that is, to take it for granted that chronic gastric disorders are almost invariably due to chronic appendicitis, gall-bladder trouble and the like. This conception too often leads to unnecessary operations.

The presence of gastric ailments alone is not sufficient indication for operating on the appendix, the gall-bladder, etc. These operations should only be performed when the indication warrants the removal of the diseased organ for its own sake. Furthermore, when in the latter group of cases gastric symptoms form a prominent part of the clinical picture, no positive promise should be given that the operation will also cure the disorders of the stomach. It may do so, but it just as often does not. The last word about the value of surgical treatment in the cases at issue will not be spoken by the surgeon, but by the medical man who has to attend to the patient after the operation. Although we grant that in a certain group of cases chronic appendicitis and cholecystitis are the main causes of gastric disturbances, this does not entitle us to disregard everything else which we recognize as disorders of the gastric function. We obtain better and more lasting results by following physiological methods of considering all etiological factors and by devising a treatment, which deals, as far as our knowledge goes, with constitutional shortcomings, systemic diseases, chronic intoxications, or whatever etiology the individual case may present.

In basing a plan of treatment upon our knowledge of etiology with the intention of removing if possible the causes of gastric disturbances, we must not overlook the condition of the stomach proper. This applies not only to cases where the stomach is primarily diseased, due to faulty habits, but also to secondary gastric disorders. We cannot divide the system into sections and attend only to one part, no matter how important that part may be as an etiological factor. We must take a broader view and consider the individual case in all its aspects. It is poor policy, for example, to claim that a neurasthenic should have treatment only for the derangement of his nervous system, without taking any notice at all of his gastric symptoms. Very often gastric disturbances form a centre of irritation for the nervous system, and their elimination greatly benefits the condition of the nervous system. Again, in incipient and advanced tuberculosis, proper attention and care bestowed upon the frequently present gastric disorders will assist us in improving the nutrition of the patient, so essential in the treatment of tuberculosis. In heart cases with broken compensation, the congestion of liver and stomach often provokes severe attacks of persistent vomiting resembling conditions usually found in gastric ulcer. Accordingly, when treated by exclusive rectal feeding, not only the vomiting ceases, but the diminished congestion of the upper abdomen in turn greatly facilitates and improves the

heart action, as the writer has observed in a number of cases. So it is with other types of secondary gastric disturbances. We must always remember, that gastric disorders influence the condition of other organs and the whole system just as much as vice versa. Aesop's fable of the belly and the members still holds true. We must make full use of all information gained by gastric analysis and other means in trying to correct disturbances of the gastric function by direct physical and medical treatment and by proper dieting. Every improvement thus accomplished will in turn benefit the underlying cause which provokes the gastric disorder.

In emphasizing the necessity of direct treatment of gastric disturbances, the writer is fully aware of the present tendency to belittle it, particularly on the part of surgeons, who, for example, allow their patients a liberal diet shortly after operations performed for the very purpose of curing gastric ailments. This utter disregard of the grave condition of the stomach, caused by the effects of narcosis and operation, is bound to do harm even to a previously normal stomach, as is shown by the sufferers, who date the beginning of their stomach trouble to the time of an operation. On the other hand, proper regard for the rôle, which secondary gastric disturbances often play in the development of a vicious circle, always proves a great help in the management of such cases.

SPLANCHNOPTOSIS, OR CONSTITUTIONAL NEUROCARDIO-VASCULAR ASTHENIA WITH OSSEOUS DYSTROPHIES AND DISPROPORTIONS.—ENTEROPTOSIS.

By JOHN C. HEMMETER, M. D., Ph. D., LL. D., of Baltimore,
Professor in the University of Maryland.

The name of this disease is derived from two Greek words ἔντερον, meaning bowel, and πτῶσις, meaning a fall. In its strictest sense, therefore, the term could only be applied to dislocations or prolapsus of the intestine or any part of the bowel. For instance, even prolapsus of the rectum in an otherwise perfectly normal individual could be called enteroptosis, which already indicates the inadequateness of this term. Splanchnoptosis which is derived from the Greek word σπλάκνα, meaning viscera, and πγῶσίς, meaning a fall. Therefore splanchnoptosis would mean the dislocation of any internal organ, but as a fall could only occur downward it would mean only downward dislocations. It is essential to point out these differences of terminology, for there are also upward dislocations of the viscera.

Judged from a more modern and comprehensive view of these conditions, both terms are inadequate and misleading, for the displacement is only a part of the great complex of pathological events that are classed under these terms.

The following are the principle structures that are in an abnormal condition in the state above defined: (1) The osseous structures and joints; (2) the nervous system, especially the autonomic and sympathetic system; (3) the heart and blood-vessels; (4) the organs of digestion and metabolism; and (5) an unknown (cryptogenic) disturbance of internal secretion.

As a result of fundamental changes in these structures we find displacement and prolapsus of the viscera as a necessary consequence. The displacements are not the cause of the manifold symptom-complex, but rather the result of it, if we can speak of a thing being a result that is congenital.

This brings us to another effort at being precise. We really have no right to call a certain position of an organ, when not normal, a ptosis, meaning a falling or prolapsed organ when that organ never has been in normal position. We can only logically speak of a falling or ptosis when an organ descends from a higher to a lower position. This is not the case in genuine enteroptosis, for individuals, who have the evidences of the four deranged states just mentioned —namely, disproportion of the

osseous system, abnormal autonomic nerve function, infirm cardiovascular performance, and displayed viscera, never have been normal and are born with all these infirmities.* After the original and brilliant clinical studies of Frantz Glénard, the next most important contribution was by Stiller. The broad and fundamental conception of enteroptosis as an inherited constitutional abnormality is one of the great discoveries of the latter.**

According to this clinician, enteroptosis is only a part-phenomenon of a very special form of body constitution, which he designates by the term of *habitus enteroptoticus.* He calls the clinical picture *asthenia universalis congenita,* a very graphic expression, but still not covering all the essential features of the disease. But, as it would be impossible to invent a term which would cover all the manifold morbid entities which are comprised in the complex of symptoms of this disease, the term universal congenital asthenia is recommended as a substitute for the term enteroptosis. Otherwise we should have to designate it as *osseous neurocardiac vascular splanchnic asthenia.*

We now see that enteroptosis is only a restricted and narrow designation. Universal congenital asthenia with splanchnoptosis would represent a more comprehensive term. It is true that the splanchnoptosis is the principle element of the disease when these sufferers present themselves to the clinician, for then they exhibit mainly four abnormal conditions: (1) Lack of tonus in the heart, blood-vessels, and muscles; (2) displacement of one or more of the viscera; (3) neurasthenia; and (4) one or more of the varieties of indigestion, usually the type called nervous dyspepsia.

During childhood the abdominal viscera are not in the same position as they occur in the adult. During puberty the stomach, spleen, pancreas, kidney, and liver rise to the positions which they hold in adult life. In the splanchnoptotic neurasthenic they never rise to their normal position. One of the principle reasons for this failure of the viscera to ascend to the normal position, that is typical in the healthy adult, is a physical impossibility to do so. In the first place, the liver, stomach, and spleen are prevented from occupying as high a position in the splanchnoptotic, because there is no room for them to rise in, owing to the narrowness and elongation of the bony thorax. This the writer has already fully described in his textbook on "Diseases of the Stomach," and furthermore in his work on "Diseases of the Intestines." But for a more recent anthropometric study of the bony structures of the splanchnoptotic, he refers the reader to his investigations published in *Internationale Beiträge z. Pathologie u. Therapie der Ernæhrungsstærungen,* Vol. 2, No. 3, 1910.

The viscera cannot occupy their normal position, for the simple reason

---

*The entire history of the clinical recognition of enteroptosis is given in the writer's work on "Diseases of the Stomach," pp. 693-730.

**Ueber Enteroptose, etc. (*Archiv fuer Verdauungskrank.*, Stuttgart, 1907).

that there is no room for them; and this lack of room is due to dispro-
portion of the osseous structures of the body, this osseous malformation
being inherited and handed down from generation to generation. It will
be noticed, by this time, that the writer does not distinguish two kinds of
splanchnoptosis as other authors do, who recognize an acquired splanch-
noptosis and a congenital form. If we understand and appreciate what
has been explained in the preceding, genuine asthenic splanchnoptosis
cannot be acquired any more than club-foot or harelip. By this he does
not mean to assert that persons, who at one time in their lives have their
viscera in perfectly normal position, cannot acquire a prolapsus of one or
the other of their internal organs; but this should not be then designated
as splanchnoptosis, by which is included all the osseous, nervous, and
cardiovascular irregularities before mentioned. When a displacement of
one particular organ is acquired in an otherwise normal individual, this
should be designated by the name of the particular organ that is out of
position, and the word dislocation or prolapsus should be used instead
of the word ptosis. Thus we might speak of dislocation of the stomach,
of the uterus, of the kidney, meaning at the same time that the individual
was not born therewith, but developed it in later life, and that the patient
is not necessarily afflicted with a simultaneous malformation of the bony
framework and infirm circulatory and nervous systems.

Diagnosis.—The best means of diagnosing dislocations of abdominal
organs are the examiner's fingers, eyes, and ears. No modern technical
or laboratory methods have exceeded the practical results gained by the
application of the senses of the physician. The eyes to see the abdominal
distension, the irregularities of contour, and the location of inflated areas
or tumors; the fingers to feel the distension of the hollow organs and
dislocation of the solid organs, to palpate their position, to percuss their
extent, and to feel the characteristic floating tenth rib of Stiller; the ears
to detect the splashing sound after certain manipulations of the colon,
stomach, or small intestine. There are other means of aiding diagnosis;
for instance, the introduction of instruments into the stomach or colon,
which may be recognizable *in situ* either by palpation or the x-rays (spiral
metallic tube of Turck and Kuhn), or by the electro-diaphane. A means
which is very readily at command is the introduction of a long colon
tube through the entire colon. Through this the colon can be distended,
and by alternately forcing in air and water, the location of the end of the
tube can be determined by auscultating on the outside of the abdomen.
The writer's experience as a teacher has impressed upon him that there
is great danger of young clinicians becoming absorbed in the technical
and artificial methods of diagnosing when the natural symptomatology,
and the hands, eyes and ears of the examiner often yield better results.
They seem to imagine that the results of the examination are not exact
unless they are ascertained by some instrumental method. Experienced
teachers will bear in mind that 90 per cent. of all the patients who con-

sult the general practitioner object to technical and instrumental methods of diagnosis. The physician himself, as a rule, gratefully accepts any practical means that can reveal the pathological condition of the patient to him; and these are the means which the writer desires to emphasize.

Changes of Sound in a Stomach Containing Semi-Fluid or Fluid Material, and Produced by Changing the Position of the Patient.—When a patient, whose stomach contains such material, is placed in the left diagonal lateral position, a dullness is produced on percussion in the left epi-

Funnel thorax with gastroptosis and upward displacement of the heart. The stomach is displaced downward, the heart upward. From Prof. Hemmeter's Clinic, University of Maryland, Baltimore.

and mesogastric region. This dullness disappears when the patient resumes the recumbent or right lateral position. If the stomach is normal and in correct position, this dullness cannot even be produced immediately after meals. If it can be produced in an abnormally low position, we are confronted with a case of gastroptosis. If it can be produced after the normal digestive period, we are confronted with motor insufficiency. If this sound can be produced five hours after breakfast, or even before breakfast when no food has been taken during the night, we are con-

fronted with a case of dilatation of the stomach with stagnation. When one uses this method of examination frequently, one gradually learns to derive more and more information from it. It is about as valuable as feeling the pulse for the determination of arterial tension and cardiac rhythm. At one time we were in danger of being persuaded that feeling of the pulse with the fingers had no clinical value whatever, and that to find out anything about the heart and circulation everybody must of necessity have a galvanometer of Einthoven or a sphygmograph. We

Funnel thorax (Trichter-Brust) with downward displacement of the stomach but upward displacement of the heart. From Prof. Hemmeter's Clinic, University of Maryland, Baltimore.

have recovered from this delusion, and so the writer is able to say that the physical signs conveyed to us by our senses are as valuable, if not more so, than the information gained by the technical armamentarium of the laboratory, though he does not mean to be understood as deprecating the latter.

Splashing Sounds.—Splashing sounds necessitate the presence in a hollow viscus of liquid and air simultaneously. The stomach when it is dislocated has lost its muscular tonicity, which means that it is in a con-

dition of atony. It cannot contract around the ingesta in the normal manner; on the contrary, it gives way to the pressure and weight of the ingesta, its lower curvature becomes distended and sinks down, its capacity becomes greater, and later on the lesser curvature sinks down also. This is a condition of ptosis developing from simple atony. In simple atony tonic contraction of the stomach is simply weakened, but peristalsis is still effective. A splashing sound does not exactly indicate a gastroptosis and enteroptosis in general. Stiller regards the splashing sound as one of the most important signs of this condition. It would lead me too far to differentiate the conditions spoken of as atony, dilatation, and gastroptosis. (See Hemmeter's "Diseases of the Stomach.")

Stiller's Sign: The Floating Tenth Rib.—Concerning the floating tenth rib, which Stiller proposed as a stigma that, as he claimed, was pathognomonic for enteroptosis (*costa decima fluctuans*), much has been written. It occurs in the writer's records in 75 per cent. of the cases of enteroptosis. It is necessary to distinguish between a movable tenth rib and an entirely detached tenth rib. Stiller did not assure himself whether the tenth rib was always normally firmly attached to the costal arch.

Tandler* and Meinert** state that a loose tenth rib is rather the rule than the exception and that it actually represents the normal condition.

Any persistent narrowing of the lower thorax must eventually force away the tenth rib from its costal attachment. This is the reason why it is so often found detached and widely separated from the ninth rib. It is therefore due to the osseous malformation of the entire thorax with a narrowing of the lower part and the usual emaciation of this class of cases. The demonstration of the floating tenth rib is to Stiller a proof of the existence of asthenic constitutional disease with splanchnoptosis.

Personally the writer regards the floating tenth rib as an unavoidable, concomitant, bony malformation occurring together with an unusually elongated bony thorax. In the article before quoted (Anthropometric Studies of the Osseous Proportions of the Human Body, with a View to Obtaining a Mathematic Expression for Enteroptosis) he has proposed the infraxyphoid angle as a diagnostic criterion for splanchnoptosis. The reason for that must be apparent on reading that article, for it is there shown that this angle is the index of the diameter of the thorax. When that article was published the writer had made measurements of the bony frame of 1,125 splanchnoptotic patients. The measurements which he recommends are the following. He repeats also a table giving the dimensions of these measurements in 810 cases of females and 315 cases of males in order that some idea of the figures to be expected might be obtained.

Hitherto there has been only one mathematic index proposed for en-

Compilation of 810 Cases Females.

Anthropometric proportions in relation to enteroptosis. (Female.)	5'	5' 3"	5' 4"	5' 5"	5' 6"	5' 7"	5' 8"	5' 9"	5' 10"	5' 11"	5' 11½"
M to X (Means distance from the manubrium to the xyphoid cartilage)	16⅔	17¹¹/₁₈	19	18	18	19	19	20	21	21	22
M to U (Means the distance from the manubrium to the umbilicus)	31⅓	32⅓	32⁴/₁₁	33	33	34	34	35	36	38	40
M to S (Means the distance from the manubrium to the symphysis)	48	49⅔	50⁵/₁₁	54	53	52	53	53	54	56	57
X to RAS (Means the distance from the xyphoid to right superspine ileum)	26⁵/₉	27	25	28	28	27	29	30	30	30	31
X to LAS (Means the distance from the xyphoid to left superspine ileum)	27⅔	26¹⁵/₁₈	27	27	28	27	28	31	30	29	30
R to LAS (Means the distance from right to left anterior and superior spine ileum)	24⅔	25⅚	25	28	27	27	28	30	30	30	31
Circum. at X (Means circumference at xyphoid)	65⅚	68⅔	68	67	66	67	70	71	73	74	76
Atlas to 5 Lumbar	58¹/₉	58²/₉	56	66	65	66	69	70	71	72	75
Height (in centimetres)	152,4	160.0	162,5	165.0	167.6	170.1	172.7	175.2	177.7	180.3	182,8
Weight (pounds)	110²/₉	125¹/₂	121	119	125	125	135	144	150	150	160
X-Angle (Means the angle below the xyphoid. Infrasternal)	66	68	68	69	69	70	70	72	73	73	75

The average (plurimum) dimension of the infraxyphoid angle in normal females varies with the height (stature) and age.

The average normal female xyphoid angle at an age of 30 and stature of 5 ft. or 152,4 cm. is 80,2 degrees (318 measurements).

COMPILATION OF 315 CASES OF MALES.

Anthropometric proportions in relation to enteroptosis. (Male.)	HEIGHT IN FEET.												
	5'	5'1"	5'2"	5'3"	5'4"	5'5"	5'6"	5'7"	5'8"	5'9"	5'10"	5'11"	5'11½"
M to X (Means distance from the mamubrium to the xyphoid cartilage)	18	19	19	19	20	20	20	21	22	23	23	24	24
M to U (Means the distance from the manubrium to the umbilicus)	32	32	34	34	34	34	35	36	36	38	38	39	40
M to S (Means the distance from the manubrium to the symphysis)	50	51	51	50	52	53	53	54	54	56	57	59	60
X to RAS (Means the distance from the xyphoid to right superspine ileum)	27	27	28	28	28	28	29	29	30	31	32	32	32
X to LAS (Means the distance from the xyphoid to left superspine ileum)	26	27	28	27	28	27	29	30	30	30	31	32	33
R to LAS (Means the distance from right to left anterior and superior spine ileum)	27	27	27	28	27	28	28	30	30	30	31	32	33
Circum. at X (Means circumference at xyphoid)	69	70	73	72	74	76	76	77	78	80	79	80	80
Atlas to 5 Lumbar	66	68	69	69	70	70	71	73	73	75	75	76	78
Weight	130	136	155	131	133	153	140	146	150	160	170	170	180
X-Angle (Means the angle below the xyphoid. Infrasternal)	68	69	69	69	70	71	72	73	73	74	75	75	76
Height in centimetres	152.4	154.9	157.4	160.0	162.5	165.0	167.6	170.1	172.7	175.2	177.7	180.3	182.8

The measurements are in the metric system (metres and centimetres). The angle is expressed in degrees of a right angle. The weight in pounds.

The average (plurimum) of the infraxyphoid angle in males varies with the stature and age. At age of 30 years and at a stature of 5 ft. or 152.4 cm. the average male infraxyphoid angle is normally 84 degrees (320 measurements).

teroptosis, the Becher-Lennhof index for asthenia universalis congenita. This is obtained by dividing the distance of the jugulum from the upper edge of the symphyses by the number expressing the smallest circumference of the abdomen and multiplying the quotient by 100. It is a purely empirical procedure and has given no results that could be called even approximately reliable. The unreliability of the average of this index, which for the normal female body in dorsal position is 75, is that one of the factors is extremely variable—namely, the abdominal circumference. This may vary 4 to 5 cm. in the same individual on the same day, according to the distension of the stomach and intestines by food, gas, feces, etc.

For males, the average of this Becher-Lennhof index is less than 75. A high index, over 80, is found in persons with palpable kidneys and the asthenic enteroptotic constitution. Before we knew that Becher and Lennhof had proposed it, we had already tried it and discarded it because of its extreme variations in normal persons.

Displacement of the Thoracic Viscera in Splanchnoptosis.—In the article quoted (Anthropometric Studies, etc.) there is a chapter entitled, "The Position and Dimensions of the Organs of the Thorax in Enteroptosis," and it is accompanied by three *x*-ray illustrations showing the low position of the heart in these cases as compared with the normal position. These positions can without difficulty be demonstrated by the othodiagraph of Franz M. Groedel. Since the publication of this article, further cases of splanchnoptosis with displaced hearts have been published by the writer's associate, Dr. Albert H. Carroll. As far as the diaphragm and the osseous limitations of the thorax will permit it, the heart is as a rule dislocated downward in all cases of splanchnoptosis, and the arch of the aorta is elongated producing what is called pendulous heart. The technical difficulties of *x*-ray photography of the thorax have all been taken into consideration in determining these positions.

The Esophagus is always unusually elongated, which should not surprise us when we reflect upon the elongation of the entire thorax. External measurements of the thorax, by means of Prof. W. Scott Hall's chest pantograph, always show an abnormally narrow thoracic contour; the thorax being compressed, as it were, both in an anteroposterior as well as in a lateral direction. The writer has seen one man in whom the distance between the xyphoid cartillage and the spinous process of the dorsal vertebra was only 3 in. These measurements usually do not meet with the appreciation they deserve by the general practitioner. The Hall chest pantograph is an instrument which can be very easily manipulated, and its application to splanchnoptosis cases gives an idea of the depth and width of the thorax, which can be acquired in no other way. The outlines obtained are very objective, graphic, and convincing. The diagnosis could be made from them alone, together with the measurements of the infraxyphoid angle which the writer regrets to state is already

being designated by his name. It is far preferable that this angle should be named by its correct anatomical designation.

Use of X-Ray for the Diagnosis of Splanchnoptosis.—Over fifteen years ago, the writer published the first method* by which the *x*-rays were used to photograph the human stomach in totality. The article is entitled "Photography of the Human Stomach by the Roentgen Ray." It is true that Wegele had in the same year suggested the introduction of a metallic spiral electrode into the stomach in such a manner that it should come to lie along the greater curvature, and that the *x*-ray method would show this spiral electrode in the photograph. Of course, this shows only the greater curvature and not the entire stomach. But the method above suggested by the writer (l. c.) is the first one to make it possible to photograph the stomach in its entirety. Such *x*-ray photography may be undertaken for the amusement of the investigator or for the sake of experimentation, but for arriving at a definite diagnosis the method is not necessary. It may even lead to serious error which is evident from the work of Rosenfeld,** and Grœdel.† These men believed to have proved that in genuine gastroptosis it is not the entire organ that is sunken, but only the pylorus, and even Elsner†† claims every gastroptosis to be nothing but a pyloroptosis, and that the displacement of this section of the stomach must necessarily be accompanied by a dilatation. Elsner is very emphatic in siding with Rosenfeld that there is no such thing as gastroptosis without dilatation of the stomach. Anatomically, therefore, these authors consider gastroptosis nothing but a sinking of the pylorus with a dilatation of the stomach between the cardia and the pylorus.

As it is well known that dilatation of the stomach cannot exist without giving rise to symptoms, this statement of Elsner's is in striking contradiction with another statement by him on p. 450 of the same book, where he quotes Stiller as emphasizing that persons with splanchnoptosis may enjoy perfect health for years; and Elsner adds that this statement is made *mit Recht*. The writer considers the results of Rosenfeld and Grœdel as one of the serious errors that has resulted from the idolatry of *x*-ray diagnosis in abdominal diseases. Neither of these men could have studied the place in Riegel's "Diseases of the Stomach," where splendid illustrations are given of prolapsed stomachs located at or below the navel, not only without any dilatation whatever, but actually very small in size. The writer has included one of the illustrations in his own text-book on "Diseases of the Stomach" demonstrating this point.

It becomes the writer's duty to emphasize here that Frantz Glénard already knew that in gastroptosis the stomach can be simply displaced and not necessarily dilated. The works of this keen diagnostician should be read with greater frequency, for although the German clinicians have

*****Boston Medical and Surgical Journal**, June 18th, 1896.
*****Zentralbl. fuer inn. Med.**, No. 1, 1899.
†*Med. Klin.*, 9, 1908.
††**Lehrbuch der Magenkrankheiten**, p. 436.

Gastroptosis with right nephrotosis. Bony thoracic measurements normal. Subxyphoid angle normal, hence not a typical case of the congenital type of splanchnoptosis but acquired and caused by tight lacing. (From Hemmeter's Diseases of the Stomach, by permission of Messrs. P. Blakiston's Son and Co.) From Prof. Hemmeter's Clinic, University of Maryland, Baltimore.

expanded the clinical conception of splanchnoptosis and perhaps disproved some of Glénard's minor contentions, it is due to him that modern medicine was enriched by accurate scientific description of one of the broadest symptom-complexes that occurs in clinical pathology.

Effect of Splanchnoptosis in Producing Compression of the Blood-Vessels, Especially the Veins of Displaced Organs.—Bearing in mind that the veins have more compressible walls than the arteries, it is intelligible how they are more obliterated than the former when an organ becomes dislocated. The very dislocation produces a forced position of the blood-vessels contained in the organ. This is especially true in the stomach and colon. The arteries are capable of conducting as much blood into the displaced organs as occurs when the organ is in normal position, but the veins cannot carry away as much blood as is conducted into the organ. The consequence of this is that, in organs that are decidedly misplaced, there is a continual passive congestion due to the incapacity of the veins to lead off the blood that enters in a given time through the arteries. This chronic hyperemia is in my opinion the principle cause of the frequent catarrhs of the stomach, the intestine, and colon. Even the well-known membranous colitis, which is met with frequently in splanchnoptosis, particularly coloptosis, is in its incipiency, at least, produced by this altered circulation.

Nephroptosis.—The most exaggerated circulatory disturbances that are met with in this condition are found in extreme cases of dislocation of the kidney—nephroptosis—where the vessels may actually be twisted off, so that we can find cases of floating kidneys recorded where the ureter was completely obliterated by a kink or twist, and where even at the operation the renal vein appeared to be almost obliterated. Where such conditions as these exist, the only hope of relief comes from replacing the organ to its normal position, and in such cases a surgical procedure to fix the loosened kidney in its normal position may be a life-saving measure. Fortunately, the necessity for surgical treatment is rare even in kidney dislocations of which various degrees must be differentiated—namely, (1) the palpable, (2) the movable, (3) the floating kidney. For dislocation of the stomach and colon, surgical operation is exceedingly rarely called for; and, in those cases in which operation was undertaken, in the writer's experience the symptoms did not disappear, and an alarmingly large proportion of the operated cases gave later evidence that the organs had again detached themselves from the location in which they had been artificially fixed. A treatment which aims at fattening of the patient has given more satisfaction to the patient and more permanent relief than any of those which he had operated.

Pathology and Causation.—When the writer states that in his opinion the genuine splanchnoptosis is always congenital, he is aware that this explains very little; and yet it is about all that can be definitely said of the etiology of splanchnoptosis, for all the rest that has been advanced

in explanation of this peculiar condition is nothing but speculation and hypothesis. Rosengart's theory* explains splanchnoptosis as a pathological reversion of the location of the abdominal organs to an embryonic state. There is nothing new in this, nor does his statement differ essentially from the expression that the condition is congenital; for congenital means that the condition exists before birth and therefore is an embryonic state. Outside of this theory there are mainly two others that could interest us. First, that of Weisker,** according to whom the abdominal organs are carried by ligaments and mesenteries, and the firmness and rigidity of these determines and maintains the equilibrium of things within the abdomen. We could understand this if there were ligaments strong enough to support such an organ as the liver. All the ligaments in the abdomen put together could not hold such a heavy organ as the liver in position if the only support were by ligaments. But the manner in which the liver is maintained in position can be ascertained by the following experiment. Open an abdomen at autopsy, and through a small hole insert the hand and forearm, and grasping the vessels on the under surface of the liver attempt to pull it down. All the strength of an average man will not suffice to do it, that is provided the subject did not have enteroptosis and was otherwise normal. The liver is held up against the diaphragm by a negative pressure similar to the negative pressure that holds the head of the femur in the socket of the acetabulum. Dissect all the ligaments away from this articulation on a dead subject, and the spherical head of the femur will still be retained in its socket. It is not the ligaments alone that keep the head in its socket, but the negative pressure. The same is true of the liver, and this being the largest and heaviest organ in the abdomen it is plausible that it should be capable of supporting whatever other organs are anatomically attached to it. The second theory, besides Rosengart's, is advocated mainly by Schatz and Leshaft† who hold that the abdominal organs are kept in place exclusively by intra-abdominal pressure, and that the ligaments do not play a very essential part in their support. A third group of authors, Schwerdt,†† Quincke‡ and Meltzing‡‡ occupy an intermediate position between those that hold that the abdominal organs are supported by ligaments and those that hold that they are supported by negative atmospheric pressure. It is not clear how the abdominal muscles could support all the abdominal organs in position, for the main force of the contraction of these muscles is, according to the writer's experiments, exerted at a point about midway between the xyphoid cartilage and the umbilicus. Accordingly, the contrac-

---

*Zeitschr. fuer diæt. und physic. Therap., Vol. I, p. 220.
**Schmidt's Jahrb., Vol. 219, 1888.
†Quoted from Mathes, Archiv fuer Gynækol., Vol. 77.
††Deutsch. med. Wochenschr., 1896.
‡Therapeut. d. Gegenw., 1905.
‡‡Archiv fuer Verdauungskr., Vol. IV, p. 181.

tion of these muscles and their normal tonus could keep in position the organs that are above this point,—for instance, the liver, stomach, and spleen; but one could not understand how the abdominal recti muscles could keep the colon in its proper position.

The Rôle of the Thoracic Respiratory Muscles and the Diaphragm as Supporters of the Abdominal Organs.—It will at first sight seem paradoxical, to one who has not thought deeply over the problem of splanchnoptosis, how the normal functioning of muscles of the chest should be capable of keeping, in proper position, heavy organs of the abdomen, which are below the chest, and yet this is exactly what is true. Physiologists recognize and have calculated the force of the negative aspiration of the thorax; but this is only spoken of in so far as it favors the reflux of venous blood to the right auricle. But it is not yet recognized to be
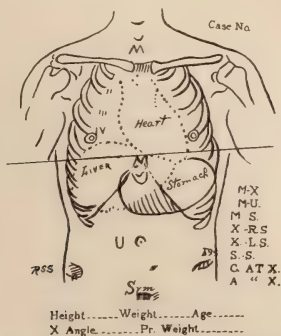
· Stamp for recording osseous anthropometric proportions in splanchnoptosis cases. Below M, the infraxyphoid angle. From Prof. Hemmeter's Clinic, University of Maryland, Baltimore.

a physiological fact that the tonicity of the respiratory muscles and of the diaphragm is the principal factor in maintaining the negative pressure that keeps the abdominal organs in position. The writer cannot go into the experiments which prove this point physiologically. but must limit himself to the statement that a strong muscular development of the thorax causes a high position of the arch of the vaulted dome of the diaphragm, and accordingly a larger part of the abdominal viscera will be contained within the bony part of the thorax. It is for this reason that he has selected thoracic measurements as indications for splanchnoptosis, and that he has chosen the infraxyphoid angle as the clinical index for this condition.

If there is such a malformation of the thorax that the diameters become narrower and narrower towards the lower part of the chest, less

and less of the abdominal contents can find room within the bony walls of the thorax. The diaphragm does not represent a vaulted arch, but its curve becomes flatter and flatter, indicating that the thorax is elongated and narrow, and the thoracic organs too low. A deeper understanding of the physiology of the aspiration of the thorax will give an insight into the method of operation by which a strong chest development becomes a factor in supporting the abdominal organs and an infirm bony thoracic development is one of the causes of splanchnoptosis.

The Factor of Physiological Tonus or Tonicity as a Cause of Maintaining the Viscera in Normal Position.—Brondgeest showed that if a frog is suspended after removing his brain, both hind legs will assume the same position; but if, in such a decapitated frog, the sciatic plexus in the left leg is cut, the leg on the left side will hang down almost straight whilst the leg on the uninjured side takes a more flexed position. The explanation offered is that the muscles on the sound side are continually receiving impulses from the motor neurons in the cord. Inasmuch as this experimental result cannot be obtained in a frog in which the posterior nerve-roots have been destroyed, it appears evident that this tonic discharge from the motor neurons is due to a constant inflow of impulses from the sensory paths. Muscle tonus, in other words, is in reality a reflex tonus which differs from the ordinary reflex movements only in the absence of a sudden visible contraction and in the more or less continuous character of the enervation. All the voluntary or striped muscles, the heart and the blood-vessels, are in this state of permanent tonus. But the unstriped or plain muscles all over the body also have the power to remain in tone; that is, they are in a continuous state of more or less contraction which is due to stimulations received from the nervous system; and, if thus conceived, this is spoken of as neurogenic tonus. But unstriped or plain muscles such as surround the stomach and intestines will exhibit of tonus to a very marked degree when removed completely from the body. In another work, the writer has given the experimental method by which this intestinal muscle tonus can be tested in the laboratory, based upon the researches of Cannon, who first called attention to the fact that the tonicity of intestinal muscle could be influenced by the amount of suprarenalin in the circulating blood; and, furthermore, that this suprarenalin was under the control of the autonomic system (Dreyer, Meltzer, Langley). For Cannon gave the evidence that emotional excitement caused the secretion, into the blood of the vena cava near the liver, of adrenalin, so that blood drawn from this neighborhood in a cat, after the animal had been excited or frightened, would arrest the rhythmic contractions of intestinal muscle that had been recorded during suspension in blood from a normal cat. When we reflect that splanchnoptosis is invariably associated with irregularities of the autonomic nervous system, we will begin to appreciate the far-reaching value of these observations of Cannon, which would lead us to wish for a biological method of testing

the blood of splanchnoptosis cases for the amount of adrenalin contained in it; for few things are more certain about splanchnoptosis than that the tonus of all the organs provided with involuntary or plain muscle is very much lowered. This accounts for the low arterial pressure that is regularly found in this class of sufferers after they have once begun to be sufferers, also for the flabby state of their muscular apparatus, the inertia of the muscular coat of the stomach and intestines, the loss of tonicity of the respiratory and abdominal muscles.

Relation of Splanchnoptosis and Vagus Tonicity. Theory that

Coloptosis. The displacement of the transverse colon is shown by the irregular dark and wavy outline above the black square marking the umbilicus, ten hours after ingestion of Hemmeter calcium carbonate test-diet for x-ray photographing. From Prof. Hemmeter's Clinic, University of Maryland, Baltimore.

Splanchnoptosis is Due to Hypertonicity of the Vagus Nerve.—In the eager search for some rational explanation of the pathogenesis of splanchnoptosis, a number of very curious hypotheses have been evolved. The most recent of these is that which would explain this morbid entity by assuming that it is due to a hypertonicity of the vagus. The writers on this subject who convey this idea do not use the word "hypertonicity," but simply call it *vagotonie,* which means vagus tonus. As every physiologist and clinician knows, the vagus is normally and always in a tonic state. We can judge this particularly well by the effect of section of the vagus on

the rate and force of the heart, but it can also be studied by the effect of the same exclusion of vagus function on the peristalsis of the stomach and intestines in some animals, and by its effect on gastric secretion. So with regard to secretion and peristalsis, as well as heart-action, the vagus is normally in a state of continual tonus. What Eppinger and Hess* mean is an excessive state of vagus excitability; and, as they expressly state that their so-called *vagotonie* patients frequently

Displacement of heart in splanchnoptosis. The stomach is filled with a deposit of calcium carbonate and calcium phosphate in oatmeal. These calcium salts are, in our opinion, as serviceable in roentgenograms of the stomach as is bismuth; are non-poisonous, and are seldom followed by obstipation. From Prof. Hemmeter's Clinic, University of Maryland, Baltimore.

have the signs of enteroptosis, it will interest us to discuss this hypothesis briefly. The so-called vagotonic constitution is also the expression of an inherited abnormality found in males as well as females who give the external indications of nervous patients. The color of the face alternates rapidly. Sudden blushes alternate with striking paleness. The

*Die Vagotonie, Berlin, 1910.

hands are bluish red, moist, cool; the individuals frequently enter upon curious sweats. Generally they are under-nourished patients with pale conjunctivæ.

The patients describe much saliva to be gathering in their mouth continually, so that they are often compelled to make swallowing efforts. The tonsils and follicles of the tongue are enlarged. If these symptoms thus far mentioned are correct, they are mainly interesting because not one of them could be referred to hypertonicity of the vagus. But a more striking discrepancy is found in the following statements—namely, that the pharyngeal reflex is absent in most cases, and that the action of the heart is excited (*die Aktion des Herzens ist meist aufgeregt*). How these two signs could be attributed to hypertonicity of the vagus is a physiological conundrum which we must leave to the authors of this hypothesis for an explanation. The afferent nerve-fibres concerned in the pharyngeal reflex are the sensory fibres from the mucous membrane of the pharynx and esophagus contained in three nerves—namely, the glosso-pharyngeal, the trigeminal, and the superior laryngeal from the vagus. But if the vagus is in a state of hypertonicity the reflex should not be "mostly absent," but should be much more easily obtained than normally.

Still more puzzling is the statement that the heart-action is excited, for if the vagus is in a hypertonic state the heart-action should be slow. The disturbances in the gastro-intestinal canal are described as follows: esophagospasm, which is supposedly due to a hypertonicity of the vagus, but as the esophagus receives motor fibres from the hypoglossal to its upper segment and from the vagus and spinal accessory to the lower segment, it is not clear why esophagospasm should be attributed to the vagus alone, and why it should be coupled in the same individual with marked atony of the stomach and bowels, for the stomach and intestines also receive their motor fibres from the vagus. The inhibitory fibres are received from the splanchnic.

In a recent article, Zweig* asserts that the above symptoms bear an extraordinary similarity to those of enteroptosis, and that we must attribute all these conditions to an abnormally heightened irritation of the vagus. Inasmuch as hyperacidity and pyrosis are frequent symptoms of enteroptosis, according to this author, he is satisfied that his conclusion is correct, because the administration of atropine relieves both the supposed spasm of the esophagus as well as the hypersecretion.

Whilst pharmacological interpretations of pathological processes are sometimes successful, it is not always logical to depend upon them exclusively. As the writer has already pointed out, splanchnoptosis cases frequently have loss of gastric secretion, even absolute achylia gastrica, and instead of spastic obstipation we frequently have atonic obstipation. Much more puzzling is the generalization of Zweig (l. c. p. 43) in which

he brings the glands with internal secretion in a causative connection with a permanent hypertonicity of the vagus. This would not mean that the glands with internal secretion are supplied by vagus fibres, but reversely, that they secrete something which maintains the lasting hyperirritability of the vagus. The first assumption, if Zweig be quoted correctly, is manifestly erroneous. He does not state in so many words that the glands with internal secretion are supplied by the vagus, but rather that they produce something which keeps the vagus permanently in a state of hypertonicity; and he compares this hypothetic substance with the adrenalin which is the normal chemical stimulator of the sympathetic system, and he theorizes on the possibility of a hormone occurring in the body which is an antagonist to adrenalin, and which is a normal stimulus to the vagus action. He presumes that this chemical substance, the antagonist to adrenalin, is the substance which keeps the entire autonomous nervous system, including the vagus, stimulated.

This hypothesis has much about it which is fascinating, but it lacks sufficient chemical basis. We are even as yet in the dark as to the manner in which the chemical hormone, adrenalin, and the terminal synapses of the sympathetic fibres co-operate. All that we know is that they do co-operate, but not always how.*

Opposed to vagus hypertonicity he conceives of a hypertonicity of the sympathetic system, and calls it *sympathicotonie*, which he conceives to be associated with symptoms opposed to *vagotonie*—namely, atony of the esophagus, which assumes that the sympathetic is the inhibitory nerve of the esophagus. No such anatomical distribution of the sympathetics has been as yet described. Secondly, he classes under *sympatheticotonie* hypermotility of the stomach, which erroneously assumes that the sympathetic is the motor nerve of the stomach; and, thirdly, he classes under this excessively irritable state of the sympathetic nervous system, *achylia gastrica*, which again assumes that the sympathetic is the inhibitory nerve to the secretion of the stomach.

There is a chemical substance of very simple structure, which does play an important rôle in co-operating with the terminal synapses of the vagus in the heart-muscle. This is potassium chloride. Not only is inhibition of the heart produced more readily when the amount of potassium is increased in the blood circulating through the coronary arteries, but it is assumed that stimulation of the vagus causes a setting free of potassium from the heart-muscle during inhibition. The difference between the manner of action of adrenalin and that of potassium chloride is this,—that adrenalin imitates the action of the sympathetic nerves on any tissue supplied with these nerves (Langley), no matter where in the body these nerves occur. The tissues themselves do not produce adrenalin. It is only produced in the adrenal glands. But with regard to vagus inhibi-

*See Hemmeter's Manual of Practical Physiology: Chapter on Internal Secretion.

tion, the potassium chloride is supposed to be set free from the heart-muscle itself. It is not always liberated from the myocardium but only during inhibition.

It is obvious that hypotheses, attempting to explain splanchnoptosis on a purely chemical theory, must be based upon chemical facts, which

Displacement of the heart in splanchnoptosis. The right kidney in the colon transversus was also displaced in this case. (On account of reducing the picture, a photographic "situs inversus" has taken place.) From Prof. Hemmeter's Clinic, University of Maryland, Baltimore.

means that we must obtain our chemical substance first, demonstrate its effect on the viscera, nerves, blood-vessels, etc., and construct the hypothesis afterwards. All hypotheses that are not founded on chemical facts simply complicate matters. The surest path to a chemical theory explain-

ing the pathogenesis of splanchnoptosis has been outlined in what the writer had to say concerning the relation of tonicity of the gastro-intestinal tract and blood-vessels to the secretion of the adrenal glands and the stimulation of the peripheral ends of the splanchnic nerves, pp. 262-263 of this article.

Reflex Time in Splanchnoptotics.—The nerve centres in the spinal cord co-operate in reflex movements; and a determination of the total time between the application of a stimulus and the beginning of the response gives a means of ascertaining the time needed for the processes within the nerve-cells. In 1898, the writer began a series of experiments on the reflex time of splanchnoptosis cases, which he neglected to continue until in moving to a new location his old notes were rediscovered. They aimed at a comparison between the reflex time of normal individuals and those of splanchnoptosis cases. The method was that usually followed by physiologists—namely, measuring the time elapsing between the beginning of a stimulation and the beginning of contraction, and subtracting from it the latent period of the muscle and the time taken by the stimulation to travel centripetally through the sensory and centrifugally through the motor nerves. Exner had obtained the figure 0.031 seconds as the true reflex time for man and Mayhew* the figure 0.042 seconds. The writer's own experimental observations, conducted according to the regular methods used in the physiological laboratory,** gave him for splanchnoptosis cases the average figure of 0.0582. This is a sufficient prolongation of the ordinary reflex to suspect an abnormal slow neurogenic process in the neurons of the cord.

Inhibition and Augmentation, or Reinforcement of Reflexes in Splanchnoptosis.—It is a well-known physiological fact that normally spinal reflexes can be suppressed entirely by other nerve impulses reaching the same part of the spinal cord. As long ago as 1863, Setschenow (Berlin, 1863) demonstrated this inhibition of reflexes in a frog from whom the cerebral hemispheres had been removed. When he stimulated the cut surfaces of the exposed hind brain by crystals of sodium chloride, the usual spinal reflexes that could be obtained by cutaneous stimulation in a normal frog were, in this brainless frog, greatly depressed. On removing the stimulating substance from the cut surface by washing with a current of normal salt solution, the reflex activities of the cord were again exhibited in the normal way. Many other facts could be cited which indicate that the brain may inhibit the activities of the spinal centres and make it probable, that a definite set of inhibitory fibres exists, arising in parts of the brain and which are distributed to the spinal cord, and that the function of these fibres is to control the activities of the spinal centres. It is conceivable, however, that this brain influence of in-

*Journ. of Experimental Medicine, pp. 2-35, 1897.
**See Hemmeter's Manual of Practical Physiology, 1912.

hibition may be exerted by some variation in the time relations, quality, and intensity of the nerve impulses, which are of a chemical nature, though neither the separate existence of inhibitory cerebral fibres to the cord nor of a chemical co-ordination has been as yet demonstrated; but the physiological fact of the inhibition of reflexes by the brain has been well established.

Displacement of the heart in splanchnoptosis. From Prof. Hemmeter's Clinic, University of Maryland, Baltimore.

In the phenomena which the writer has already described as a delayer reflex in splanchnoptosis, this effect may be due to a primary impediment in the spinal neurons themselves as well as to one of the forms of inhibition just referred to. It is very difficult to decide this point in human beings—namely, whether we are dealing with delayed neurogenic

process in the spinal neurons or an exaggerated inhibition exerted by the brain.

Augmentation of the Reinforcement of the Reflex in Splanchnoptosis.
—If in a splanchnoptosis case the exact intensity of a single induction shock is determined, which is just sufficient to bring about the patellar reflex, it will be found that the reflex time varies greatly according to the varying conditions of the patient, especially the varying conditions of the spinal cord. There are periods in which the reflex time is short-ened and periods in which the reflex time is delayed, though the delay is in more than two-thirds of all cases found to be the rule. The entire phenomena of all reflexes in splanchnoptosis cases give the impression as if the patient were at times under the antagonistic influences of two op-posing toxins. One, for example, simulating strychnine and the other opium. The whole matter of the condition of the neurons in the cord of splanchnoptosis cases urgently calls for investigation from the standpoint of the physiologist.

Diagnosis.—After what has already been said concerning the diag-nosis, the writer may be permitted to be brief concerning this point. As a matter of fact, diagnosis of enteroptosis is rarely difficult. This is particularly true of those dislocations that affect the stomach. Here the simple distension of the stomach by air through a stomach-tube, or by CO_2 gas generated by making the patient drink two solutions, first, one of tartaric acid in water (an even teaspoonful) and after this a solution of bicarbonate of soda (an even teaspoonful), will be sufficient to demon-strate the position. X-ray photography, which the writer practices fre-quently through his assistants and the electric transillumination of the stomach, is interesting when scientific studies have to be made for the purpose of publication; but the general practitioner and even the spec-ialist can usually dispense with these methods. But in all cases, he would recommend taking the bony measurements which have been heretofore mentioned, and particularly making a record of the angle below the xyphoid cartilage. The chemistry of the stomach should be studied be-cause it calls for varied methods of treatment. Some gastroptosis cases have no secretion of gastric juice whatever. Some have a hypersecretion, and much comfort can be given by proper attention to the chemistry of the stomach, which in one case may be accomplished by giving dilute hydrochloric acid and in another case may be accomplished by giving alkalies. It depends upon what the chemical analysis reveals.

For the colon the distension with air or CO_2 gas is also a valuable diag-nostic method.

For the determination of displacement of other abdominal organs, palpation and percussion yield the best diagnostic results. Next to the stomach and colon we are most frequently confronted with dislocations of the kidney. Here we must distinguish four degrees of dislocation:[*]—

Nephroptosis.—First degree: The kidney is palpable at the height of inspiration, but disappears after expiration. This degree of renal movability is normal; second degree: The entire kidney can be palpated at the height of inspiration, but it rises again during expiration. In this stage the kidney still exhibits respiratory excursions; third degree: The kidney is found as a palpable tumor below the edge of the ribs but does

Coloptosis and compression of the sigmoid flexure. The left side of the patient is on the right side of this x-ray photograph. From Prof. Hemmeter's Clinic, University of Maryland, Baltimore.

not show any respiratory excursion whatever, nevertheless it can still be passively pushed back under the arch of the ribs; fourth degree: The kidney is fixed below the arch of the ribs and can no longer be pushed back into normal position. To this the writer might add a fifth degree in which the kidney is similar to the degrees three and four, just de-

scribed, but can be moved about almost anywhere in the abdomen and eventually give rise to kinking off of the ureter.

Dislocations of the Liver, Hepatoptosis.—There are various degrees of this condition, and one could almost classify them similarly to the classification just given for the kidney dislocations. They can be diagnosed by the methods of palpation and percussion.

Splenoptosis.—Uncomplicated dislocations of the spleen are very rare. The spleen is normally not a heavy organ, and the pressure of the liver is not exerted upon it; therefore, it is not so frequently dislocated as the kidney. When the spleen is found dislocated and enlarged, it is more often due to organic disease like malaria, syphilis, tuberculosis, cancer, and Banti's disease.

Symptomatology.—(a) Subjective Symptoms. Though admirable advances have been made in our methods of comprehending this singular and striking condition since the time of Virchow, Glénard, Ewald, and especially by the recent beautiful clinical investigations of Stiller, we are yet far from fully understanding it. In fact, we are just beginning to have an insight into the profound nervous, organic, vascular, visceral, osseous irregularities which characterize the fully developed type of splanchnoptosis. A human pathological entity like this begins in the fundamental disposition of the germ-layers of the embryo—in fact, one could say without exaggeration that it begins in the embryos of the ancestors, since as far as the writer has been able to study this condition there is no human abnormality more persistent in perpetuating itself by inheritance. If, therefore, we do not understand the disease, we can also not understand its symptomatology which at times is extremely perplexing. It is not difficult to say, for instance, that the subjective symptoms are due to general neurasthenia and to atony of the digestive tract. What does the clinician mean when he says general neurasthenia? Has he any definite conception in his brain, which is capable of being met by an exact therapy? A few moments' reflection over this question will convince one how difficult the problem of symptomatology and treatment is.

At a recent meeting of the American Physiological Association (December, 1911), Meltzer and Joseph, as well as Cannon, reported on Experiments on the Effects of Stimulation of the Peripheral End of the Splanchnic Nerves. Meltzer and Joseph made use of the pupil as an index of the effect of stimulating the peripheral end of the splanchnic in augmenting the amount of adrenalin in the blood. They had extirpated the superior cervical ganglion prior to stimulating the splanchnic. This ganglion sends fibres that stimulate the constrictor muscles of the pupil, just the reverse of what suprarenal extract would do; therefore, this substance could show its effect only after antagonistic activity of this ganglion has been excluded in mammals. For a complete account of the effect of adrenalin on the viscera in general, the reader is referred to the writer's "Manual of Physiology," pp. 160-7.

Both Meltzer and Cannon have demonstrated that the stimulation of the peripheral end of the splanchnic causes an increased secretion of adrenalin into the blood, because this stimulation is followed by dilatation of the pupil.

The effects of adrenalin on various tissues are analogous to the effects of stimulating the sympathetic nerves which supply those same tissues. Prominent for our discussion are the following effects: (1) In all blood-vessels it causes constriction; (2) the pupil is dilated; (3) the muscle of the intestine in all mammalia is inhibited with the exception of the ileocecal sphincter; (4) the stomach in mammals is relaxed; (5) the effect of stimulation of the sympathetic nerves on the bladder and uterus varies in different animals, but a similar one is always produced by the application of adrenalin. Over twelve years ago Dreyer* demonstrated that the secretory nerves of the adrenals are contained in the splanchnic.

What bearing has all this physiology on the symptomatology of splanchnoptosis? It is a common experience of clinicians that the most far-reaching and poignant of all the subjective symptoms of the splanchnoptotic are referable to his sympathetic nervous system. It appears to be in a state of continual irritation, and this is explainable by the plausible assumption that the splanchnic nerves are in a state of more or less variable but continuous irritation, caused by traction on the abdominal ligaments by the displaced organs or by the weight and pressure of the organs themselves. In addition to that it has been assumed that the altered chemistry of digestion, that the writer has already referred to, produces altered products of proteid and carbohydrate decomposition, which in turn the diseased lining membrane of the stomach and intestine is incapable of resynthesizing during absorption. Bacterial decomposition also may play a rôle. At any rate, in any outspoken and pronounced case of the disease, the patient appears to be in a more or less permanent state of sympathetic irritation associated with gastrointestinal auto-intoxication.

Splanchnoptosis without Symptoms.—That there must be a gradual adaptation of the system brought about through generation after generation of splanchnoptosis is suggested by the fact that such cases are occasionally met with in the better walks of life where comparatively good health was enjoyed; and, moreover, even where there are symptoms during adolescence and middle age they disappear during advancing age. The danger of splanchnoptosis or constitutional visceral and vascular asthenia, therefore, becomes less and less as age progresses.

Objective Symptoms.—The most striking signs are revealed by mere inspection, for the abnormally elongated and narrow thorax, the long neck, the obliquely declivitous shoulders and the declivitous ribs at once portray the *habitus enteroptoticus*—the outward indication of a universal asthenia of the nervous system and the blood-vessels. Very likely the

Amer. Journ. of Phys., pp. 200-203, 1899.

latter are only secondarily affected through a lack of proper vascular tonus, which, as we know, is dependent upon an unceasing control of the blood-vessels by vasomotor nerves. The abdomen shows thin, flabby walls. It is stretched out and elongated. The distance of the navel from the xyphoid cartilage is shown in the writer's measurements to be much above the normal. The upper part of the abdomen may be flat or even con-

Reproduction of a classical painting by van Eyck representing Eve. Altar painting from the Cathedral at Ghent, Belgium. The figure is here reproduced to demonstrate that the model must have been a woman with the evident build of a case of splanchnoptosis.

cave, and the lower part arched outward, particularly on standing. This arching forward of the lower contours of the abdomen is produced by the weight of the displaced stomach and colon.

Splanchnoptosis Cases Depicted in Classical Paintings.—The models for the classical painters must have been individuals of the lower stations of life, for we frequently see in the paintings of the Italian and Holland

school representations of human beings who have the unmistakable objective signs of splanchnoptosis; and the most amazing thing about these classical paintings is that great artists took these disproportioned individuals for models to represent Adam and Eve. See for instance the painting Jan van Eyck on p. 9 of Dr. Eugen Holländer's beautiful work "Die Medizin in der Klassischen Malerei." The writer has measured the proportions of this woman's arm with a pair of accurate compasses and found them abnormal. Observe also the long sunken-in thorax and the protruding abdomen.

The Adam and Eve of Andrea Verocchio, of Hans Memling, and the female figures of Botticelli are examples of classic paintings taken from enteroptotic models. And in the paintings of Lucas Cranach individuals with pendulous abdomens are seen, which by art critics are assumed to represent pregnancies, but are surely taken from cases of splanchnoptosis.

Even some of the models of Rembrandt are apparently taken from splanchnoptosis cases. The infraxyphoid or epigastric angle is very narrow. Concerning the significance of the floating tenth rib, the writer has already drawn attention. It will be unnecessary to go into detail as to the methods used in ascertaining the size and location of the abdominal and thoracic organs.*

Prognosis.—The hopes of clinicians, to cure such a condition as the writer has pictured in the foregoing, find their limitations in the fundamental constitutional abnormality, conditions which are congenital and which cannot be removed. The asthenic architecture of this class of individuals is persistent, and the anatomical deviations, which he has described as occurring in the viscera, are permanent. Splanchnoptosis must therefore be regarded as an irreparable condition. If some authors, for instance Einhorn, claim to have restored gastroptosis to a perfectly normal position,** we must believe that it was not a case of genuine enteroptosis, but one of those types of pseudogastroptosis without the general constitutional asthenia that are usually described as "acquired." That such gastroptosis might be acquired, for instance, from tight-lacing, or loss of the tonus of the abdominal recti muscles, is quite intelligible; and the removal of the cause will bring about a restoration to the normal position.

Treatment.—It is the great desert of Glénard to have in his very first article on the subject called attention to the fact that these visceral displacements are always associated with a profound neurasthenia.† The entire literature of the subject up to the year 1910 is quoted in the writer's "Diseases of the Stomach." Although it is impossible to place the dislocated organs back into their normal position, it is not difficult to treat

---

*Hemmeter: Diseases of the Stomach, pp. 693-730; and Diseases of the Intestines, Chapter on Enteroptosis, Vol. II, pp. 463-470.
**Berl. klin. Wochenschr., 1896.
†Enteroptose et Neurasthénie, Soc. Méd. des Hôp. de Paris, 1886.

successfully the neurasthenia. The treatment of enteroptosis cannot be based upon causal indications, because the splanchnoptosis is congenital and persistent, and therefore all therapy must be directed to a general invigoration and improvement of the nutrition of the patient. If the writer should be asked to state the basic principle of treatment in enteroptosis, he would say avoid surgical operations, apply external supporting bandages carefully adapted to each individual, and fatten the patient. The treatment then should be (1) dietetic, (2) mechanical, and (3) medicinal. If the peristaltic power of the stomach is good, it is not wise to give a hard and fast dietetic schema. Let them eat almost anything they please except such food as is manifestly irrational. As long as the stools indicate that the food is digested well, the tyranny of a severe diet should be avoided. As soon, however, as the expulsive power of the stomach is impaired, the patient should then be put in bed, submit to a Mitchell-Playfair rest and fattening cure. The principle of the diet is the same as in atony of the stomach, small and frequent meals consisting of highly nutritious substances. The assimilation of proteid and fat will show itself by three evidences: (1) Better nerve reaction and resisting power; (2) improved condition of the cellular elements of the blood; and (3) increased strength of the patient as shown by the ergograph.

Mechanical Treatment.—It is not an easy matter to find a proper abdominal bandage for each case of splanchnoptosis. It requires personal and individual study to discover the proper fitting bandage for each case, for frequently patients are so lean that no bandage will fit well. Plaster bandages, such as are recommended by Lincoln,* and also by Rosewater, are very helpful. They should always be put on with the patient in a reclining position.

Medicinal Treatment.—When colitis or gastritis occurs, it has to be treated just as this condition would be when no splanchnoptosis is present. Persistent obstipation is a very annoying complication. It calls for oil enema, a properly selected diet, and an occasional laxative of which aloes and phenolphthalein combined with strychnine are the least harmful. The writer must emphasize his repeated experience that the so-called purgative mineral waters, especially the Hunyadi-Janos and the Rubinat-condal, are actually harmful; in fact, all waters, the action of which depends upon a concentration of salts, are injurious. When there is much gaseous distension all carbohydrates should be eliminated from the diet. The magnesium salicylate sometimes gives relief in these cases of gaseous fermentation, but not if the diet contains the regular amount of carbohydrates. Electrical treatment by means of the slow, long-waved sinusoidal current applied with one plate over the spine and the other over the umbilicus, has, in a number of cases, appeared to me to improve the peristaltic power of the stomach and in-

Medical Record, p. 69, January 12th, 1901.

testines. Whenever it is intended to treat the gastro-intestinal tract by electricity, it is well to bear in mind that it is moved by plain or involuntary muscle-fibre for which the electrical stimulus is not as adequate as it is for voluntary fibre. It is necessary to bear in mind that involuntary muscle-fibre requires a far greater current to affect contraction; and the rate of stimulation to produce a tetanus of unstriped involuntary muscle is much slower than for cross-striped muscle. For the stomach muscle, for instance, the best effects are obtained by one stimulus at each five seconds. This disregard for the peculiar reaction of unstriped muscle to electricity gave rise to an interesting controversy between Einhorn and Meltzer about twelve years ago, and which can be found recorded in Boas' *Archiv fuer Verdauungskrankheiten*. The principle reason why some clinicians get no effect from electrical treatment of the gastro-intestinal tract is to be found in this difficulty. They fail to adapt the kind, quality, and intensity of the electric current to the peculiar physiology of the plain muscle.

Surgical Operations for Splanchnoptosis.—In the writer's "Diseases of the Stomach" (p. 727) he expressed the hope at that time that it might become possible to treat this condition by surgical procedure. It was twelve years ago since that was first written, and he has kept a very close record of those cases upon which such surgical procedures were undertaken. In more than two-thirds of those from whom he could get a record, the stomach, when sewed into normal position in one way or the other, did not stay there, but was found displaced again in periods varying from one year to eighteen months after the operation. Reflecting again upon his conception of enteroptosis, the writer considers it his duty to emphasize that the surgeons that undertake such operations start from false premises; and it is his conviction that reports concerning the results that are claimed for such operations are based upon an insufficient period of observation, and are to be taken sceptically. Surgical treatment of enteroptosis, in my conviction, is only justifiable when the dislocation has secondarily led to complications; for instance, when a floating kidney has led to symptoms of incarceration in the ileocecal region, when the colon is so elongated as to have caused ileus, or when an extremely prolapsed stomach produces a kinking off of the duodenum. After having closely observed the after-effect of many abdominal operations in the hospital of the University of Maryland, the writer concluded that such complications are extremely rare. He also considers it his duty to publish the fact that in 3 cases the death of the patient was directly attributable to excessive surgical enterprise. Two of these cases were in wives of physicians, which he saw about one year before their death. A gynecologist had performed a double nephropexy, but in one case the right kidney was loose again, and in the other the right kidney was in the state of the fourth degree which has already been described in this paper. Another surgeon had operated for gall-stones on the same patient but found none.

A third had removed the appendix and both ovaries. Both these women had the scars of four extensive operations. Not one of these operations was justifiable in the writer's opinion; he insists on the fact that splanchnoptosis is a persisting condition that is congenital and cannot be cured by surgical procedure. It is deplorable that these patients are so readily persuaded to be operated upon, and it is much more regrettable that the true nature of splanchnoptosis is so little understood that there are always surgeons to be found who are ready to perform such operations.

MEDICAL AND SURGICAL PROGRESS.

THE TREATMENT OF INTESTINAL STASIS.

By WILLIAM ENGELBACH, M. D., of the Editorial Staff.

1. Alt (Trans. Hufelandische Gesellschaft, February 9th, 1911, *Berl. klin. Wochenschr.*, No. 11, 1911).
2. Binnie (*American Journ. Surg.*, Vol. XXVI, No. 1, 1912).
3. Brown (Trans. Southern Surgical, *Journ. Amer. Med. Assoc.*, p. 138, January 13th, 1912).
4. Buck (*Deutsche Medizinalzeitung*, No. 48, 1910).
5. De Quervain (*Archiv fuer Klin.*, 316).
6. Distaso (*Lancet*, April 29th, 1911).
7. Glitsch (*Muench. med. Wochenschr.*, No. 23, p. 1243, June 6th, 1911).
8. Goldman (*Ibid.*).
9. Henle (*Zentralbl. fuer Chir.*, No. 42, 1910).
10. Hertzler Trans. Surg. Sect., Amer. Med. Assoc., 1909).
11. Hirschberg (*Therapie der Gegenwart*, No. 7, p. 334, 1910).
12. Hofmeister (*Beiträge z. klin. Chir.*, LXXI, p. 832).
13. Jackson (Trans. West. Surg. Assoc., 1908).
14. Lane (*Lancet*, April 30th, 1910).
15. Lardennois (*La Presse Méd.*, June 4th, 1910).
16. Maxer, Dohrn and Zuelzer (*Berl. klin. Wochenschr.*, No. 48, 1908).
17. Moullin (*Lancet*, January 16th, 1909).
18. Plehn (Trans. Hufelandische Gesellschaft, Feb. 9th, 1911, *Berl. klin. Wochenschr.*, No. 11, 1911).
19. Pronai (*Wiener klin. Rundschau*, No. 1, p. 111, 1910).
20. Roeder (*Journ. Amer. Med. Assoc.*, February 25th, 1911).
21. Saar (*Med. Klin.*, No. 11, 1910).
22. Starling (*Zentralbl. fuer Phys. und Path. d. Stoffewechsels*, Nos. 5 and 6, 1907).
23. Strauss (Trans. Hufelandische Gesellschaft, February 9th, 1911, *Berl. klin. Wochenschr.*, No. 11, 1911).
24. Travel (*Rev. méd. de la Suisse Romande.*, January 20th, 1904).
25. Unger (*Berl. klin. Wochenschr.*, No. 11, 1911).
26. Vœlsker (*Zentralbl. fuer Chir.*, No. 29, 1911).
27. Bloch (*Zentralbl. fuer Chir.*, No. 17, 1911).
28. Wilms (*Zentralbl. fuer Chir.*, No. 37, 1911).
29. Zuelzer (*Internat. Zentralorgan fuer Blut- und Serumforschung. Serologia*, II. Folia, VI, 1910, Abs. *Med. Klin.*, No. 11, 1910).

Stasis of the large intestine is a subject which has gained marked prominence during the past year. A revival of the study of the condition, formerly considered under the name of obstipation or chronic constipation, has been attended with considerable new interest on account of the recent theories advanced for its definite anatomicopathological causes; the local, general, and remote lesions assigned to the intoxication resulting therefrom; and the reported unusual results, in the form of relief of abdominal and other symptoms, of distant organs or structures, from its radical treatment. Besides the direct therapeutic application which these pathological changes, now considered responsible by some for this condition, may have, they will also, no doubt, do much to clear up many vague abdominal symptoms previously considered to be without anatomical basis. The relation of this stasis to general and local morbid stasis, such as general neurasthenic conditions, chronic arthritis, and the reinfection of tuberculosis, has opened a wide field for investigation. The most attractive work upon the treatment of this stasis has been done from two entirely different points of view: (1) That of attempting to restore the normal movements of the gastro-intestinal tract by the use of a substance supposed to be normal physiological peristaltic stimulant—peristaltic hormone; (2) the radical surgical treatment removing the mechanical interferences to a supposedly normal peristalsis such as adhesions, pericolonic membranes, kinks, volvulus, etc. Apparently, rather extreme views have been taken by investigators on both sides, and differentiation of cases adapted to either treatment seems to be more or less lacking in the reports. Without doubt, a more definite classification, based upon an established etiology with the definite indications for treatment, will be evolved from more extended study and the experience gained from observing the effects of these new ideas governing the cause and treatment of decreased motility of the large intestine.

Starling led the way to the physiological treatment of obstipation by his discovery of a group of substances which stimulate the secretions of certain organs. He coined the term "hormone." (from the Greek, to incite, to stimulate) for these specific substances. These products are of chemical composition and are best compared with the alkaloids which exercise a specific action on certain living cells when injected into the body. They produce so-called chemical reflexes which, by way of the blood-stream, stimulate the function of distant organs. An example of these hormones is "secretin," discovered by Bayliss and Starling; a substance which is elaborated in intestinal epithelial by the action of hydrochloric acid and gastric juice and is responsible for the secretion of pancreatic juice. Another is "gastrin," a hormone, discovered by Edkins, formed by the mucous membrane of the pylorus, which, when injected into the venous blood, produces a secretion of hydrochloric acid and pepsin in the stomach. Fulfilling an early prediction of Starling, Zuelzer has discovered the existence of a hormone which has specific action in stimulating the intestinal peristalsis. This hormone has been found in the gastric mucous membrane of all animals, thus far examined, at the time when the digestive process was at its height; but it is encountered in ample quantities only in the spleen which is supposed to be its store-house. Injected intravenously into animals, this substance promptly produces energetic intestinal peristalsis of varied duration, beginning at the pylorus and continuing throughout the large intestine.

Maxer and Zuelzer found, without a single exception, that the various organs contained such small amounts of this hormone that their extracts,

when injected into the blood-stream of experimental animals, produced more marked toxic effects than stimulation of the peristalsis. The stomachs of the various animals used might have contained tetanus bacilli or spores, and for this reason were considered useless as a source for this substance. The spleen, on the other hand, contained large quantities of this hormone, and it could be obtained from this organ in a sterile medium. There are two theories advanced for the explanation of the effect of this hormone. The first is that it re-establishes the elaboration of this substance in those cases in which chronic constipation has been due to more or less decreased secretion of the hormone. The second is that the re-establishment of the peristalsis decreases the auto-intoxication and thus relieves the abdominal ganglia of the inhibiting effect of the same, which prevents the action of this hormone. Administered by intramuscular injections, they noted a rise of temperature as high as 102.2° F. for a short time. There occurred no other constitutional disturbances, and the local reaction was a slight pain in the majority of the cases. For their first experiments on humans, they selected only grave cases of chronic constipation, i. e., cases in which spontaneous evacuation without the use of cathartics or enemas had not been obtained for from one to twenty years. Their first report was made upon 26 cases. Five cases could not be followed for sufficient time to be of any value. Of the remaining 21 cases, a very favorable result was obtained in 15, while in 6 there was no benefit observed. In the favorable cases, the injection of this peristaltic hormone was followed by regular evacuations which have since taken place spontaneously, one or two a day, without other aid. The first effect was usually noticed on the first or second day; but, in some cases, it was delayed until the fifth or seventh. The duration of the favorable cases, reported at the time of this communication, varied from a few to six months. Why all the cases were not effected in the same way; the authors were unable to explain. Græmer reports the result of this hormone upon 2 cases of intestinal atony. In both cases, the injection was followed by a single but ample evacuation every day and by the disappearance of the disagreeable disturbance caused by intestinal fermentation which had been the annoying symptom previous to the treatment. The stools in both cases were changed from clay-colored stools to normal ones. All reports to the authors that of ten epileptic patients. all of whom had suffered previously for a long time from chronic constipation, treated by Orland with intramuscular injections, four had obtained a favorable result of regular spontaneous evacuation.

Adlers reports the effects of this hormone upon 2 cases of intestinal paresis caused from peritonitis following operation, and 2 cases of intestinal carcinoma with marked effect upon the peristaltic action of the intestine. In none of these cases was the termination favorable; but, in all cases, a decided stimulating effect upon the peristalsis was observed. The injections were made intravenously in the foregoing cases, and the author concludes that this medicament is not contraindicated even in organic obstruction, as the peristaltic waves are of such slight violence as to cause no damage. He suggests that it might be of value in differential diagnosis between mechanical, dynamic or adynamic ileus. In cases of slight volvulus, it might be possible to remove the same by setting up a well-regulated peristalsis, and thus be considered an indicator for operation. Saar reports the results of this remedy upon 3 cases, all of which were affected favorably for a considerable length of time. He advises in giving this treatment, first, that it is desirable to make the injection early

in the morning, which permits the temperature reaction to disappear before night; and, secondly, the employment of a lubricant, preferably a single dose of castor-oil emulsion. The latter, he believes, would overcome the failures which have been reported in cases having an accumulation of feces in the sigmoid, which could not be dislodged by oil enemas.

Henle tried the effect of this medicine and reports in detail upon 2 cases of acute intestinal peresis, both of which were due to severe peritonitis. The hormone was given intravenously before the patient had recovered from the anesthetic. In both cases the effect was marked, the patient passing flatus three or four hours after its introduction. He had further employed this hormone with success, in a number of other post-operative cases of severe intestinal paresis. In the majority of the cases, expulsion of the flatus took place within sixteen hours. He adds, however, that it is difficult to state to what extent the specific therapy for the stimulation of the peristalsis tends to accelerate the recovery of the cases. He believes, however, that his experience with this remedy justified him in stating that it should be recognized and recommended as an extremely valuable physiological stimulant of intestinal peristalsis. Furthermore, it had a wide usefulness as such an agent in abdominal surgery.

Unger reports in detail 2 cases in which this peristaltic hormone produced a very happy result. One was the case of a child and the other an adult. He says that it was indicated first in chronic constipation and second in acute intestinal paresis of the adynamic type.

In discussing the paper of Zuelzer, Strauss, physician in charge of the Internal Department of the Jewish Hospital, Berlin, stated that he had used the injection in 5 cases of obstinate chronic constipation. In all these cases he obtained more or less severe reactions, constitutional and local. Pains at the site of the injection were complained of from four to six days in all cases. Temperature was observed for one or more days. In one case, chills occurred. Only in one case was a therapeutic success obtained and this did not begin until the eighth day after the injection. He could not explain why only one of these 5 cases, apparently of the same nature, reacted favorably to the treatment. He would consider the intravenous injection more advantageous than the intramuscular one, on account of the severe local reaction following the latter. Plehn, in 1 case, and Goldman, in 12 cases, reported favorably upon the intravenous injection of this hormone.

Zuelzer, in closing the discussion, said that, in using the intramuscular injections, needles of sufficient length, 10 c.cm., should be used; that if this was done, the injection was painless, and if pain did occur, it endured for only one day. He added, however, that the intravenous injection should be given in preference. He said that he had received many communications from surgeons reporting good results from this hormone in post-operative paresis. In chronic constipation, the hormone was found to give a positive result in from 60 to 70 per cent. of the cases. Thirty to 40 per cent. of the failures occurred chiefly in the spastic and not the atonic forms of chronic constipation, the clinical differences of which are not clear.

Glitsch reports his results with this new hormone upon 16 cases of severe obstipation. In some of these cases the obstipation was a primary condition, and in others it was an accompanying symptom of another disease. In none of these cases did he observe untoward by-effects. In fourteen the diagnosis was atonic and in two spastic constipation. He

believes it is important to differentiate the type of constipation and to exclude mechanical causes for the same; for, if this preparation has for its physiological effect an increase of the peristalsis, it should have no effect upon the partial dynamic or mechanical types of obstipation. The cases which he reports were all severe types of obstipation, the duration of which varied from four months to thirty-six years. In 10 cases, one injection was used. In 6 cases, two injections were given. Two of the latter were not affected, but he thinks that if they were given larger doses or more injections, they might have also been benefited. All the cases were given intramuscular injections of 20 c.cm. of hormonal. In nearly all these, a slight rise of temperature occurred within twelve hours after the injection. The injections were painless and produced no other local or constitutional by-effects. In the majority of cases, a small evacuation occurred within six or eight hours after the injection, and this was followed by daily morning evacuation. In 9 cases, the result was entirely prompt and durable for a number of months, producing what was considered a complete cure. In 5 cases, the effect was more unsatisfactory, the reaction occurred less promptly, a slight bowel movement was secured, but only continued for a short time. In 2 cases, the reaction was only feeble and lasted for a few days. In discussing his results and those of other authors reviewed in his communication, he states that this medication seems to be particularly adapted to that form of constipation associated with neurasthenia and hysteria. He believes that it should also be a useful agent to relieve the underlying causes of a number of forms of colitis, such as mucous colitis, or that form associated with scybala, causing an intermittent diarrhea and constipation. He believes it could be used in diagnosis, particularly in such cases as alimentary glycosuria (Ebstein) in which the sugar disappears from the urine after thoroughly emptying the bowel. He also predicts that it will serve as a valuable adjunct in radiography of the gastro-intestinal tract. By stimulating the peristalsis it will intensify and more clearly define those lesions which produce local interference with the mobility of this tract. He recommends that it should not be used to the exclusion of all other methods of treatment. Even in those cases in which the temporary effect has been good, other therapeutic measures, such as diet, massage, regular evacuation, etc., should be carried out in order to maintain its action. His conclusions are as follow: (1) Hormonal has without doubt a specific influence upon the intestinal peristalsis; (2) in the majority of cases of obstipation, its effect is prompt and lasting; (3) other therapeutic measures should be directed towards maintaining normal peristaltic movement in addition to its usage; (4) it does not produce untoward local effects, or general reaction; (5) it is indicated in even the most chronic and severe types of obstipation, for in his experience it was just in such cases that it gave the best results; (6) up to the present time, there has been no differentiation of the type of obstipation for which it seems to be especially indicated.

Clinical reports on the use of aperitol have been published by Hirschberg and Pronai. Hirschberg used the preparation for several months in a large number of patients, and on the whole confirms the good properties of this new purgative, as described by other authors. It is a matter of experience that a tendency to constipation is greater in women than in men, and the dosage must be adjusted accordingly. For men, Hirschberg found that one to two tablets were usually sufficient to obtain the desired results, while for women, two to three tablets are required.

Aperitol is readily taken by women, and, in the author's experience, it never caused pain. An evacuation was obtained about six to seven hours after taking the remedy, and neither irritant nor toxic symptoms were observed. Even larger doses (four to five tablets) were borne without trouble. Aperitol is best taken at bedtime or in the morning. Pronai prescribed aperitol in 326 cases (women) and confirms its usefulness in many cases in which dietetic and physical measures are not applicable. With two to three tablets, he found that a painless motion could be produced in the majority of cases. The remedy rarely fails, and three-quarters of the patients thus treated stand it without pain. In the other cases, the sedative component of aperitol, the valerian (though not too weak) is apparently not suitable. Pronai cannot give any method of ascertaining to which cases this applies. The first evacuation occurs as a rule after eight hours, in pregnant women perhaps later, though not infrequently it is necessary to wait more than fifteen hours for the effect. In two-thirds of the cases, one to two motions are obtained, occasionally more. In two-thirds of the cases, a pultaceous first evacuation is to be expected, in other cases the motion is fluid, rarely hard. Permanent regulation of the motions or disturbance of the intestinal function was not expected. Occasionally constipation was transitorily produced, although this sequel does not follow diarrhea with any particular frequency. Even after eight tablets have been taken, no damage to the organism was observed. Pronai has ascertained further that after the use of aperitol no phenolphthalein is present in the mother's milk, so that diarrhea occurring in the infants cannot be attributed to aperitol taken by the mother.

Szereszewski reports satisfactory results from the action of aperitol. In constipation with bleeding anal fissure, in constipation during pregnancy, after radical operation for strangulated inguinal hernia, in acute and chronic nephritis, painful hemorrhoids, etc., the remedy produced a painless motion. A great advantage of aperitol is said by the author to be the fact, that in chronic constipation it is not necessary to increase the dose of the remedy, since no habituation to it is produced. It is particularly useful in the presence of anal fissures, hemorrhoids, chronic colitis and dysentery, in which the motions are, as a rule, accompanied by pain and tenesmus. Buck also confirms the value of aperitol in constipation.

The extreme opposite view in the treatment of obstipation from that directed toward restoring the normal peristalsis is the treatment which has in view relieving the mechanical interference of normal intestinal mobility. Lane gives quite an extended discussion of the etiology of chronic constipation, and attempts to prove that all cases are due to mechanical causes, such as adhesions, flexures, kinks, volvulus, etc. He states that these pathological changes, producing mechanical obstruction, can be considered under two distinct headings: (1) Changes which ensue in consequence of the viscera being exposed to mechanical conditions other than normal; (2) degenerative processes produced by the absorption of toxic material in the gastric intestinal tract. He defines chronic constipation as a condition causing stasis of fecal matter in the large intestine. This may take place in some cases in which there are daily evacuations. He claims that this stasis produces a toxemia which is responsible for many general nervous and debilitated states as well as numerous local lesions, such as arthritis, etc. He states, as an indication for operative treatment for constipation, those cases which have failed to react to other treatment, whether medical or mechanical. In some of his cases he obtained good results by dividing constricting bands and ad-

hesions, followed by subsequent careful attention to the proper functions of the bowel. In a considerable number of cases treated in this way, particularly in women, the relief was only temporary, since the obstruction occurred sooner or later. In his early cases, after the appendix had been removed and the cecum and flexures freed from adhesions, some patients suffered, following the operation, from pain in the location of the cecum, which he designates "cecal pain." He was then led to perform a lateral anastomosis, between the ileum and the sigmoid, in some of the cases in which cecal pain still persisted. He then divided the ileum completely and implanted it into the sigmoid without overcoming this complaint in all the cases. Hard masses of feces and distension of the cecum by gases were designated as the cause of pain in the region of the cecum; and extended experience told him that, if any portion of the large bowel was left beyond the junction of the ileum, it would become dilated sooner or later. This dilatation interfered with satisfactory evacuation and caused discomfort from distension due to fecal masses or gas. He, therefore, found it necessary in order to relieve the constipation, the auto-intoxication from the same, and the discomfort following accumulations in the cecum, to remove completely the large bowel including a part or the whole of the sigmoid. Occasionally he was satisfied to divide the transverse colon at the splenic flexor, having implanted the distal portion of the ileum into the sigmoid. In those cases in which the patients were not able to sustain the entire removal of the large bowel, preliminary implantation of the ileum into the sigmoid is recommended. This operation relieves the patient of the toxemia and overcomes the constipation. In case the symptoms resulting from the distension of the ascending colon caused sufficient trouble, the large bowel was removed at a later date with much less risk. In a number of cases of extreme toxemia without pain, simple lateral anastomosis of the ileum to the sigmoid was sufficient to relieve all the symptoms. During these operations should the pylorus be found to be hung up by adhesions to the liver or gall-bladder, the adhesions are divided and reformation of the same prevented by employment of gold leaf. In a considerable number of cases, he has observed marked improvement of gastric dilatation, not due to the obstruction of the pylorus, from simple gastro-enterostomy. Movable kidneys were anchored, and constricted bands between small intestines were treated according to local indications. Volvulus of the cecum, frequently producing acute obstruction, was treated by an ileosigmoidostomy with or without removal of the cecum, according to the individual case. Volvulus of the sigmoid was treated by shortening the mesosigmoid, thus fixing this part of the large intestine, removing it entirely, doing an end-to-end anastomosis of the ileum to the rectum, or by producing a lateral anastomosis between its dilated parts. Of a large number of private cases upon which an ileosigmoidostomy was made, no deaths occurred from the operation. One patient died six months after the operation from acute intestinal obstruction. Of 9 cases, in which the entire large bowel was removed, one died from bursting of a deep-seated stitch abscess in the peritoneal cavity.

Binnie, in a very exhaustive article, completely reviews the subject of colonic intoxication from the standpoint of its pathology and surgical treatment. He critically considers the many etiological factors advanced for this condition and discusses in detail the many remote distant lesions resulting from the same, besides reporting a number of very interesting cases both in adult and childhood. He attributes many distant lesions,

such as arthritis, reinfection in tuberculosis, etc., to intestinal stasis, and believes that it has a very wide bearing upon many other obscure conditions. He says, however, a great many cases, even when apparently severe, respond to patient and thorough medical treatment. He gives, as the principles of medical treatment for this condition, the following: (1) Support of the abdomen with a well-fitting binder or lifting corset; (2) strengthening the abdominal muscles by exercise; (3) regulating of the diet, avoiding foods which leave a large amount of material to be absorbed by the large intestine; (4) regulation of the bowel movement by rectal flushing, with use of oils and petroleum products (e. g., white vaseline) by the mouth; and (5) judicious use of abdominal massage. If intelligent and persistent medical treatment fails to give satisfactory results, then surgical means must be considered. The developmental anomalies caused by mobile or displaced cecum frequently cause no symptoms. When they do, they either simulate those of chronic appendicitis or are distinctly referable to absorption of toxins of the large intestine due to chronic intestinal stasis. Wilms claims excellent results from cecopexy in cases of mobile cecum simulating chronic appendicitis. If the cecum is not only ptotic but very large, he advises ileotransversotomy instead of cecopexy. Dryer found the cecum freely mobile in 67 per cent. of the autopsies performed by him; hence, it cannot be considered pathological. He points out that a certain degree of mobility is of advantage in pregnant women, as it permits the cecum to be pushed out of the way of the enlarging uterus.

Fromme, while agreeing that a moderate mobility of the cecum is of advantage to women, yet remarks that too great mobility can and does lead to trouble in that the cecum may be pushed up by the uterus and twisted on itself. It seemed reasonable to suppose that a freely mobile cecum and ascending colon would be in the same condition as a normal sigmoid flexure, i. e., it would give rise to no trouble; but that a freely mobile cecum with a fixed colon might suffer torsion just as a sigmoid colon, the base of whose meson is contracted, is liable to volvulus. The same would apply to an ascending colon which was partly mobile and partly fixed. Travel describes pericolitic adhesions which he thinks impede peristalsis. He also describes a band immobilizing but not constricting the colon, just above the cecum, the cecum so mobile that it was possible to turn the cecum up over the band so as to touch the liver. Division of the band and cecopexy gave good immediate results.

Lardennois describes a remarkable case of ptosis and mobility of the cecum in which that viscus was 13 cm. long and was twisted on the axis of the ascending colon and adherent by a band (congenital or acquired) to the colon. Lardennois has seen 4 other cases of similar extensive ptosis out of eighty subjects examined. He thinks that cecal ptosis is often due (a) to undue length of the cecum itself; (b) to excessive length of the ascending colon. The average length of the ascending colon is 19 cm. (Cohan), but it varies from 10 to 29 cm. When the colon is very long, it is disproportionate and ill adapted to the abdominal cavity, and hence tends to push into the pelvis; (c) to undue mobility of the initial portion of the large intestine. Contributing causes are constipation; want of prominence of psoas muscle; size of pelvis; abuse of corset; weakening of the abdominal wall, e. g., by pregnancy.

Clark believes that ptoses of the colon (cecum-transverse-sigmoid) are generally congenital, and that apparent ptosis of the transverse colon is often merly due to that intestine being so redundant that in order to find domicile in the abdominal cavity part of it must lie low down.

Much importance is given in these communications to the pericolonic membranes, bands and adhesions as a causative factor in the production of chronic obstipation. Virchow first described these pathological conditions under the term *mesenterialschrumpfung*, and regarded it as a chronic peritonitis. Lane writes: "The contraction or cicatrization affects only the posterior layer of the mesentery. In its earliest stages, it can be felt rather than seen, since the contracted area of peritoneum then only appears more opaque than that in its vicinity. Later distinct thickenings or bands form along the lines of resistance. These are blended with the mesentery. When fully developed, they form a mesentery which, while it is in contact with the peritoneum of the normal mesentery, is distinct from it, and attaches the wall of the bowel adjacent to it. The anchored portion of the ileum is not only kinked in one plane, but its lumen is also reduced by torsion of this part of the bowel itself on its long axis. This results from the progressive encroachment of the newly-formed contracting bands of peritoneum on the wall of the bowel in the vicinity of the mesentery." In 1905 Binnie described a condition simulating chronic appendicitis in which on operation the ascending colon and cecum were found covered by a delicate curtain or web of adhesions. These adhesions or membranes were more marked towards the hepatic flexure and contained numerous delicate blood-vessels which ran transversely to the long axis of the colon. The membrane may cover the transverse colon and the sigmoid, but is most commonly seen on the ascending colon. It is easily stripped off the intestine, leaving usually a smooth surface. Jackson has given a good description of this membrane. It is usually delicate as a spider-web. Binnie says he has not been able to assure himself as to whether its removal leaves the peritoneum intact or not. Hertzler believes the condition one of "varicosity of the peritoneum" due to a more or less distant inflammation, and that the membrane itself consists of peritoneum mobilized by a hyaline degeneration of the subperitoneal connective-tissue. However it may be formed, it may cause pressure on the colon and unite the ascending to the transverse colon.

In less severe cases of pericolonic adhesions, the operation of ileosigmoidostomy is often of value. Moullin contents himself with forming a large lateral anastomosis between the ileum and sigmoid, but most surgeons divide the ileum between the point of anastomosis and the cecum, either closing both ends of the divided ileum or using the distal segment as a safety-valve through which to irrigate the segregated segments of the large intestine.

De Quervain objects to ileosigmoidostomy because he has found that the patient may subsequently suffer from diarrhea due to physical disturbances and to indulgence in vegetables. De Quervain also uses the cogent argument that antiperistalsis may undo any good the operation may have done. The possibilities of antiperistalsis are well illustrated in a report by Bloch. A woman who occasionally suffered from obstruction was given a bismuth-meal. The bismuth was only evacuated after 117 hours with the aid of castor oil. The x-rays used at intervals showed that a comparatively large segment of the transverse colon emptied itself twice into the cecum. De Quervain advocates excision of the ascending and part of the transverse colon. When the fecal stasis, as shown by the x-rays, is in the ascending colon, he thinks that ileotransversotomy is better than ileosigmoidostomy, but that when the stasis is in the descending colon, ileosigmoidostomy is preferable. If the colon is not excised when ileotransversotomy is performed, De Quervain diminishes

its lumen by plication and especially exaggerates the hepatic flexure by judicious suturing.

Roeder, Voelcker, and Hofmeister do not believe that mobility of the cecum is of importance in causing stasis. They claim that dilatation of the cecum due to incomplete obstruction of the ascending colon is the actual cause. In recent or less grave cases, an endeavor has been made to render the dilated and mobile cecum more mobile by dividing with cautery all parietocolonic folds or adhesions which contracted the intestine. In principle, this is similar to Jackson's operation in which he strips off the spider-web membrane which covers the colon. Jackson has had some gratifying and some disappointing results.

Brown operated on 16 carefully selected cases of intestinal stasis. In all these cases a diagnosis had been made by a process of exclusion, and in each intestinal stasis had been demonstrated by means of the bismuth-meal. Fourteen patients presented well-defined pericolonic membranes, and in all there was present kinking of the ileum. In 2 of the cases the condition found at operation was undoubtedly due to primary involvement of the appendix. In 9 of these cases, the constipation and the symptoms of intestinal toxemia have been entirely relieved, the patients gaining in weight and showing marked general improvement. In 5 of the 14 cases, while the improvement has been satisfactory, much annoyance has resulted from gaseous distension and pain in the excluded cecum and colon. He strongly emphasized that neither the Lane operation nor any of the suspension operations should be undertaken unless there are well-defined demonstrable pathological lesions justifying their performance. All so-called atonic and neurasthenic types of enteroptosis would yield far better results if given proper rest, hygienic and dietetic treatment. He says that the surgical indications should be governed by a definite pathology, both palpable and perceptible. Unless there is definite obstruction to the large bowel, seriously interfering with its mechanics, operations which had for their purpose the switching of the fecal current were not justified. The Lane operation had a well-defined field of usefulness. Like all new procedures, however, it will be applied to cases in which the indications for its application are not present. The most important fact resulting from the investigations of Lane, himself and others, who have been working along similar lines, was the fact that it has been conclusively demonstrated that the entire large bowel could be put out of commission with perfect safety. The knowledge thus acquired would be of great benefit. In many cases of amebic dysentery, mucous colitis, and other ulcerative conditions found in the large bowel, the making of a temporary anus on the right side, thereby putting physiologically at rest the large intestine, is advisable; and when the purposes of this rest have been accomplished, the restoration and continuity of the bowel can be done quickly and safely. In many cases in which formerly a left-side colostomy was performed, the operation on the right side would be of much greater advantage by simply opening the abdomen through a small incision, dividing the ileum above the ileocecal valve, and purse-stringing a tube in both proximal and distal ends of the gut; and then fixing the two ends of bowel in the wound. Such an anus could be closed without difficulty, and possesses many advantages in selected cases over the left colostomy. While the left-side operation could be made without difficulty, its closure was a serious surgical undertaking. Brown could not agree with the conclusions of Coffey upon intestinal fixation operations. In those cases where there exists no mechanical obstruction, he believed

that the method of treatment which he outlined—namely, putting these patients to bed, making a right-side anus, and then putting the large bowel completely at rest, and later on following this either with the restoration of bowel continuity or the Lane operation, had results which were better than when fixation, so splendidly illustrated by Coffey, was done.

Intoxication from intestinal stasis has been held responsible for very serious remote results by these investigators. In speaking of infective arthritis, Goldthwaite, Painter and Osborn state that long-standing or acute fermental trouble in the intestine may be a source of absorption and infection. Lane also reports favorably upon the effects of cases of arthritis following this treatment of intestinal stasis. Distaso, assistant to Metchnikoff, studied the tuberculous cases operated upon by Lane twelve months after operation. He writes that the results are that the children submitted to this operation are in excellent health in spite of the fact that all previous surgical and medical treatments have failed, and exclusion of the large bowel has brought them back to health. How to explain these facts that at first sight seem paradoxical? We know that it is almost certain that it is only by the alimentary tract that one can become infected, because it has been clearly demonstrated that the pulmonary route plays a part that is almost negligible in tuberculous infection. So that primary pulmonary tubercle ought to be considered a rarity, and is almost always secondary because the bacilli can pass through the mucous lining of the intestinal wall and are carried by the blood-stream to the lungs. We know, on the other hand, that localized tubercle is curable, while generalized tuberculosis is not. What is the cause of this fact? The most reasonable hypothesis is that the individual is rendered sensitive by the first infection to a second infection. The experiments of Nocard demonstrate the possibility of the truth of this supposition. He isolated calves infected with tubercle and found that they recovered; on the other hand, calves similarly infected which were not isolated, but exposed to the possibility of additional accidental infections, did not recover. In other words, the possibility of a reinfection is the salient point in tuberculous patients. The method of isolation practised in sanatoria, and the giving to the patients of sputum cups instead of allowing them to use handkerchiefs, are the practical outcomes of this view.

A tuberculous patient, in whom the process is generalized, unconsciously brings about his own destruction as he swallows into his intestinal tract the bacilli from his lungs, and thus submits himself to a constant source of reinfection. Thus there is set up a viscious circle, in which the bacilli become more virulent while passing through the organism.

It is in the large intestine in which the tuberculous process localizes itself that we find the most suitable circumstances for this reinfection. If we exclude it, reinfection is no longer possible and the individual should thus be cured even in advanced cases. This is exactly what has happened in these children whose clinical reports are presented. They were considered incurable, but these cases have demonstrated to the contrary.

From what we have just said it follows: (1) that these cases apparently prove the hypothesis that the route of infection of the tuberculous virus is via the intestine; (2) that a tuberculous infection is only curable when reinoculation is prevented; and (3) that advanced tuberculous lesions can be cured if we remove the disposing cause. This brings the writer to speak about the problem of tuberculosis. We know that a large

number of people at necropsy show tuberculous lesions and yet that in a large percentage the lesion was not fatal, so that we must look for other causes that make this disease such a veritable scourge. These predisposing causes are alcoholism, syphilis, constipation and other things. Especially must we consider constipation with its predisposing effects in favor of the tubercle bacillus, because it permits fecal stasis and consequently brings about the most suitable conditions for the development of all the organisms found in the intestinal flora in these cases, with the results that (1) the possibility of the penetration of the intestinal wall by the tubercle bacillus is brought about; and (2) there is associated the auto-intoxication produced by the putrefaction of the intestinal contents brought about by the condition of stasis.

THE X-RAY IN INTESTINAL DIAGNOSIS.

A REVIEW OF RECENT LITERATURE.

By E. H. SKINNER, M. D., of the Editorial Staff.

1. Hænisch: The Roentgen Examination in Constrictions of the Colon. Roentgenological Early Diagnosis of Carcinoma of the Large Intestine. (*Muench. med. Wochenschr.*, Vol. 58, No. 45, p. 2369, November 7th, 1911.)

2. Holding: Observations of Cases of Constipation and Obstipation. (*Amer. Quar. of Roentgenology,* Vol. 3, No. 2, p. 150, July, 1911.)

3. Holzknecht and Singer: Upon Objective Findings in Spastic Obstipation. (*Muench. med. Wochenschr.*, Vol. 58, No. 48, p. 2537, November 28th, 1911.)

4. Grœdel and Seyberth: Upon Loop-Formation of the Descending Colon in Constipation. (*Zeitschr. fuer Roentgenkunde,* Vol. 13, No. 5, p. 196, May, 1911.)

5. Satterlee and LeWald: Some Apparently Obscure Conditions of the Gastro-Intestinal Tract and the Practical Application of the Roentgen Ray in Their Diagnosis. (*Journ. Amer. Med. Assoc.,* Vol. LVII, No. 16, p. 1255, October 14th, 1911.)

Satterlee and LeWald restrict their paper to the size, position and motility of the gastro-intestinal tract in normal patients or in patients with splanchnoptosis with or without intestinal symptoms. They speak of the lack of certainty in the results of clinical tests for size, position and motility of the hollow viscera, and find that the x-ray solves the problem. Chemical tests for motility of the stomach and intestine have been unreliable; peristalsis of the viscera is only seen in emaciated patients; the length of time consumed in digestion by the examination of the feces after the ingestion of non-absorbable foods is often inaccurate; tests for determining the residual food in the stomach are tedious and annoying to the patient, and determine only approximately the final result. All such information, with other important data, can be shown by the x-ray. Satterlee and LeWald have pursued this work with a properly conducted series of plates, while most of the European radiologists favor the fluoroscope for gastro-intestinal examinations. They use bismuth subcarbonate suspended in fermented milk, and have had no untoward effects from large amounts of bismuth, finding also that it passes through the intestinal canal practically unchanged. Their results, as to the size, shape and motility of the colon, have been very satisfactory, the organ being readily identified by its size, position and sacculations. They have classified the cases into "(1) normal colons, (2) abnormally long and looped colons, (3) ptotic colons, with or without abnormal length and loops, and (4) abnormally short colons. As to the shape of the colons, they have suggested the following terms: (a) straight, transverse colons—the strictly

normal; (b) the U-shaped colon, caused by one large loop dipping down toward the pelvis; (c) the V-shaped colon which is similar; the double U-shaped colon, with one loop from the hepatic and another from the splenic portion of the transverse colon; (e) the W-shaped colon which is similar to the last; (f) the dragon-shaped colon.

"A ptosis of the colon is recognized by the low position of the caput coli and of the hepatic flexure. The hepatic flexure is normally at or above the level of the umbilicus. Loops of the colon may exist without a co-existing ptosis. The most constant point of fixation of the colon is at the splenic flexure where the intestine is attached by the phrenocolonic ligament to the left abdominal wall under the spleen. The average height of the splenic flexure is 4 inches above the umbilicus." (Determining the location of abdominal viscera with the umbilicus as a landmark is not always satisfactory because of the changes in position of the umbilicus from congenital defects, operations, obesity, etc.)

The conclusions reached by Satterlee and LeWald are as follow:—

1. The length of time required for contents of the gastro-intestinal tract to reach each division of the tract, and the time in which each division is completely emptied, can be definitely determined in each individual by the bismuth Roentgen-ray test.

2. The normal motility of each part of the gastro-intestinal tract can be definitely established.

3. The food immediately after ingestion begins to pass into the small intestine; and, by the end of an hour, at least one-quarter of the gastric contents is in the jejunum.

4. The stomach is emptied of 500 c.cm. of milk or soup in two and a half to four hours.

5. The existence of an increased amount of free hydrochloric acid in the gastric contents has no influence on the final emptying of the stomach.

6. The time which this meal consumes in passing to the cecum averages two hours, varying from one to four hours, and is shorter in children.

7. The complete emptying time of the small intestines after this meal is probably about six hours.

8. Complete emptying of the colon requires from twenty-four to forty-eight hours.

9. The bismuth Roentgen-ray test is harmless and practical.

10. The ordinary methods of medical treatment can be more intelligently applied with the improvement in diagnosis accomplished by this test.

11. The bismuth Roentgen-ray test should be employed before an operation is performed for a chronic condition of the gastro-intestinal tract.

Hænisch has contributed an exhaustive article upon the x-ray examination in constrictions of the large intestine and the early radiological diagnosis of carcinoma of the colon. He places the highest value upon the inspection of the colon with the fluorescent screen while an injection of bismuth is being made per rectum. He contends that the fluoroscopic examination of the gastro-intestinal canal is more important than the radiographic examination, inasmuch as the former permits a study of the motility of the intestine, while the latter exhibits only a single, momentary phase of the position and filling of the colon. In cases of carcinoma of the colon, the fluoroscopic examination shows that the flow of the bismuth stops at the site of the pathology, the bowel bulges below and then suddenly a little finger-like process of bismuth passes onward again.

Hænisch pursues this examination upon the trocoscope and uses the well-known mixture of bismuth carbonate, bolus alba and water (300 grm. bolus alba, thoroughly mixed in ½ litre of warm water; then 76 grm. of bismuth carbonate is added and thoroughly mixed, and, at the last, to the whole is added another ½ litre of water to thin the mixture). The patient lies upon the trocoscope, and the injection is made through a glass tube in the rectum attached to the irrigator tube, and the examination proceeds in an absolutely dark room after the radiologist has a satisfactory visual accommodation (about 8 to 10 minutes). He warns against pressing the screen against the abdomen, as one may compress the intestine against the bony parts of the skeleton, such as the spinal column or ilia, producing shadows of confusion.

One notes first the filling of the ampulla of the rectum, then the passage of the bismuth into the sigmoid and descending colon, and then into the transverse colon and into the ascending colon and cecum. In a few cases he has noted the bismuth mixture pass through the ileocecal valve into the small intestine. Then one notes the filling up of the sacculations of the large intestine. In a normal case the entire large intestine becomes filled in a few minutes, one litre of the mixture being sufficient in most cases. If there is a stricture of the lumen of the colon, one notes the hesitation of the bismuth mixture upon the distal side of it. The permanency of such phenomena, or the formation of a finger-like projection through a narrow lumen and the subsequent filling of the whole colon, depends entirely upon the nature of the constriction. Hænisch warns against the diagnosis or attempted diagnosis of constrictions or carcinoma of the large intestine after the ingestion of a bismuth meal per os, because of the slow passage of the food through the large intestine and the inability to get a complete filling of the colon by this method. His article carries the report of 19 cases selected from a large number of patients examined by the fluoroscope after the bismuth injection.

Hænisch's conclusions are as follow:—

1. For the Roentgen examination of the large intestine, the bismuth meal by the mouth is not satisfactory.

2. The radiograph is not satisfactory. The principal thing is the examination of the colon upon the fluoroscopic screen while the injection is given in the recumbent position. Especially interesting phases may be radiographed.

3. This method permits the demonstration of anomalies of position, the formation of loops, dilatation and stenosis of the lumen, diverticulum, adhesions, spasms, and the attachment of palpable tumors to the intestine.

4. It is possible to differentiate narrowing of the lumen of the colon due to tumors of the intestine, spasms, or narrowing from adhesions.

5. In a large number of cases the Roentgen examination can only give an indication for the advisability of exploratory laparotomy. In isolated cases the early diagnosis of carcinoma is really possible. In other cases it is possible to estimate the exact location of a tumor, and in others it established the cause of obstinate constipation.

6. At the end of the examination one should remove the bismuth mixture from the bowel by injection, as very frequently the patient may have great pain from the hardening of the bismuth masses.

Holzknecht and Singer, in a short article upon the "Objective Findings in Spastic Obstipation," favor the filling of the colon by means of a rectal enema as more satisfactory than the examination of these cases after the bismuth meal. They recommend the rectal clysma prepared as

follows: To 1 litre of distilled water is added a cold mixture of 2 heaping teaspoonfuls of potato starch mixed in ¾ litre of cold water. After cooking one adds 160 grm. barium sulphate in ¼ litre of hot water. After cooking for five minutes the mixture is cooled to 45° C. The mixture is then placed in an ice-box for several days. Holzknecht uses as much as 1,700 to 2,000 c.cm. of this mixture to procure a complete filling of the large intestine. Bismuth carbonate, 120 grm., may be substituted for the barium sulphate.

His conclusions are as follow:—

1. In spastic obstipation one finds, in a majority of cases examined roentgenologically with a rectal clysma, a high degree of hypertonicity of the distal portion of the colon.

2. The proximal portion of the colon shows most often a normal tonicity and a hypermotility.

3. The boundary between these two manifestations of the colon is not in all cases the same, but is always found between the splenic flexure and the end of the descending colon.

4. At the rectosigmoidal juncture one finds the spastic intermissions. Its demonstration is not always technically successful.

Grœdel and Seyberth report upon loop-formation of the descending colon as a causal factor in constipation. They found two anatomical causes to which atony may be attributed: (1) anomalous position of the colonic flexures, by which the normal course of the large intestine becomes changed; (2) the abnormal length of the large intestine. The latter has, up to the present time, been especially frequent in the transverse colon, but is seldom found in the sigmoid. They report 3 cases in which there was an abnormal length- and loop-formation of the descending colon. The condition was discovered by an *x*-ray examination after the method of Hænisch, previously described. The clinical symptoms in none of the cases pointed directly to such abnormal length and looping of the descending colon. Grœdel and Seyberth remark that it is very easy to confuse this looping of the descending colon with a similar condition of the transverse colon; and they feel that, since they have made the radiographs of the bismuth-filled large intestine, they are able to interpret the position of the loop more readily, when upon fluoroscopic examination they were not sure of the part of the intestine to which the loop belonged. They feel, therefore, that in their previous fluoroscopic examinations they may have overlooked many cases of loops in an abnormally long descending colon. They again ask the question, What is the primary condition, the constipation or the intestinal anomaly? They take the position that the loop-formation in the descending colon depends most frequently upon a congenital abnormal length of the descending branch of the large intestine, and that these anomalies lend themselves especially to an obstinate constipation.

Holding maintains certain general facts learned from cases of constipation, as follow:—

1. In nervous patients we frequently encounter hyper-peristalsis.

2. As a rule there is little delay in the transmission of the intestinal contents from the pylorus to the cecum.

3. The colon is largest at the cecum and grows progressively smaller as it approaches the rectum.

4. The commonest sites of delay in the progress of intestinal contents through the colon are: (a) at the cecum; (b) at the sigmoid flexure; (c) in the transverse and descending colon; (d) in the ampulla of the rectum.

5. The commonest sites of obstruction in the colon by tumor are: (a) at the splenic flexure; (b) in the sigmoid; (c) at the hepatic flexure.

6. Constipation has become so prevalent that the cecum seems to act as a retention reservoir into which the intestinal contents are discharged fairly promptly in most cases; but, from this point on, excretion seems to become more a matter of mechanical extrusion than a matter of peristalsis. I have frequently been moved to call this apparent stasis and evident distension and accumulation of fecal matter at the cecum "lake constipation." This stasis must have a very important bearing on the frequency of appendicitis.

7. The marked difference in the position of the colon in the prone and erect positions makes one seriously question the Divine Architect's wisdom when he allowed evolution to raise man from all fours to stand upright upon his hind legs.

8. The fallacy of the so-called high enema: on introduction of the fluid beyond the sphincter, the fluid will go rapidly to the cecum unless obstructed by bowel-contents or a narrowing of the lumen of the intestine.

9. The fecal current is like any other current, the centre moves faster than the sides, and collections of bismuth will frequently be observed for many days after the bulk of the bismuth has been evacuated.

10. The accurate localization of delayed transit in the fecal current, or kinks or flexures in the intestines, or obstruction, has an important bearing on the treatment of the individual case; prompt passage to the sigmoid flexure with constipation indicates enemata, proctoscopy, investigation of Houston's valves, O'Beirne's sphincter. Prompt passage to the cecum with constipation indicates the addition of massage to other treatments. Obstipation, sharp angulation of the colon, stenosis, congenital hypoplasia, with or without tumor formation, with delay in the fecal advance at a constant point, may indicate surgical intervention such as intestinal anastomosis.

11. Colectomy in cases of ptosis seems unnecessarily radical; the writer has found that the various hydriatic, mechanical, pharmacological, electrical, and less radical surgical methods have been adequate in all cases so far observed, without resorting to colectomy.

12. Observations on the human appendix corroborate Cannon's observations on the appendix in animals, i. e., that antiperistaltic waves pass the contents of the cecum into the lumen of the appendix.

Since this review was prepared several articles upon the subject have appeared:—

Codman: Diagnosis of Diseases of the Stomach and Intestine by the X-Ray. (*Boston Med. and Surg. Journ.*, Vol. CLXVI, No. 5, p. 155. February 1st, 1912.)

Jordan: Radiography in Intestinal Stasis. (*Lancet*, Vol. CLXXXI, No. 4609, p. 1824, December 30th, 1911, Vol. II, No. XXVII, 1911.)

Yeomans: Diagnosis of Obscure Conditions of the Colon with the Aid of the Roentgen Rays. (*Medical Record*, Vol. 81, No. 4, p. 159, January 27th, 1912, whole No. 2151.)

The article by Codman is itself a review of the work of Holzknecht's "Stomach Studies" and Hertz's splendid work upon constipation.

Yeomans feels that the Roentgen ray has enriched our knowledge of the physiology and pathology of the digestive canal, and that in the domain of diagnosis of obscure intestinal lesions it is on a par with, and often exceeds in value the exploratory laparotomy without incurring the risks

of the latter. The technique described is entirely radiographic and follows closely that of Groedel (Roentgen-diagnostik in der Innere Medizin). The radiographic illustrations are excellent reproductions of negatives by Dr. Lewis Gregory Cole. There may be some dispute upon Yeomans' assertion that, because of the inconvenience and expense, the physician will resort to the Roentgen rays in obscure cases only. The symptoms and signs calling for a roentgenographic examination, after failure of the usual clinical methods, are (a) pain, in addition to that often present in the epigastrium and common to many an abdominal irritation, colicky or distensive in character, in close association with and dependent upon the particular part of the colon involved; (b) constipation without symptoms of chronic autotoxemia; (c) tumor, palpable or suspected; (d) abnormal constitution of the stool-mucus, pus, or blood.

Jordan's article offers much upon radiographic demonstration of Lane's ileal kinks and the radical surgical treatment. He describes intestinal stasis as a "chronic disease due to the retention for too long a time of the intestinal contents, and the toxic absorption resulting from its undue retention. The symptoms may be slight or severe but they are very definite. They may be enumerated as follows: abdominal pain, often severe; general depression and want of energy, which may be so extreme as to make life intolerable; poor appetite, with attacks of nausea or vomiting; a bad taste in the mouth; breath of an unpleasant odor; headache, backache, muscular pains and aching in the joints; cold hands and feet and other signs of circulation. Constipation is usually a marked symptom; often is persisted in spite of all treatment, the patient being compelled to rely on purgative drugs and injections. Flatulence is always present and leads to attacks of abdominal distention. There is tenderness to pressure over the abdomen, especially in certain regions, of which the right iliac fossa is the most usual. The skin is stained, sometimes to a deep brown color; it feels unhealthy, as though wanting in elasticity; the sweat has a disagreeable odor. The breasts show changes such as are usually described as chronic mastitis; in more advanced cases cystic degeneration takes place, and the breasts are then in a condition in which a transition to cancer is very liable to occur. Similar changes are produced in other glands, and at operations on these patients chronic pancreatitis is found to exist; in many cases cholecystitis is present also, and gall-stones are very often found."

Lane has described the anatomical changes that lead to the disease and the secondary effects that follow. It is in this part of the work that Jordan has been able to bring the resources of radiography to his aid by obtaining, upon the fluorescent screen and upon photographic plates, actual irrefutable ocular evidence of the reality of the changes under consideration.

SURGERY OF GASTRIC AND DUODENAL ULCER.

By MALVERN B. CLOPTON, M. D., of the Editorial Staff.

1. Moynihan: Duodenal Ulcer. (W. B. Saunders Co., 1910.)
2. Bishop: An Address on Surgical Gastric Disorders, Their Treatment and Results. (*Lancet,* Vol. II, pp. 743-749, 1911.)
3. Mayo: Transgastric Excision of Calloused Ulcer of Posterior Wall of the Body of the Stomach. (*Annals of Surgery,* Vol. LII. p. 797, 1910.)
4. Finney: Some Problems in Gastro-intestinal Surgery. (*Journ. Amer. Med. Assoc.,* Vol. LVI, No. 22, p. 1625, 1911.)
5. Cumsten: Factors in Mortality and Complications of Gastro-enterostomy. (*New York Med. Journ.,* Vol. XCI, p. 115, January 15th, 1910.)
6. Rodman: Gastric Ulcer. (*Intern. Clinic,* No. 19, Vol. IV, p. 140, 1909.)
7. Mayo: Ulcer of the Stomach and Duodenum with Special Reference to the End Results. (*Annals of Surgery,* No. 3, Vol. LIV, p. 313, 1911.)
8. Dunham: Clinical Results of Gastro-enterostomy for Nonmalignant Diseases. (*Journ. Amer. Med. Assoc.,* Vol. LV. pp, 1777-1781, 1910.)

Gastric enterostomy comes to mind as the subject to begin the review of gastric surgery, because it represents the main topic of discussion during the past decade when the modern treatment of non-malignant stomach disorders was considered. The technique of the operation has been worked out so satisfactorily that its principles are established; and, in the hands of masters, little concern about the operation itself is felt, but unfortunately in the hands of ordinary surgeons, not especially skilled in abdominal surgery, the results are at times, to say the least, disappointing. Pain, troublesome indigestion, regurgitation of food, anemia, are occasionally observed; but, if these unsatisfactory results are analyzed, it is usually found that an operation has been done, in a case where the indications are not warranted, or that the operation was not skilfully performed. The short-loop posterior gastrojejunostomy is now the operation generally used for obstructing scars from ulcer near the pylorus, and this has been so universally practised for the past few years that late results are now available to form conclusions.

Problems of diagnosis still excite the most interest, and the selection of the proper cases for certain operations is the greatest problem confronting the internist and surgeon. More practitioners are realizing that, in many cases of "chronic dyspepsia" and "acid stomach" under their care, it is their duty to advise surgical consultation; and the surgeons are limiting the character of gastric or duodenal lesions for which operation should be performed and the character of the operation. Moynihan says

that severe recurrent hyperchlorhydria indicates duodenal ulcer which should always be treated by operation. This is the extreme position in one class of cases. The real question has now come in the milder class in which prompt relief from rest and dietetic treatment takes place, but in which the return to work and active life brings a return of symptoms. It has come to this position, that after a patient has been carried through acute attacks of ulcer, which will in most cases relapse, the patient may live long though probably suffering. It is the duty of the physician to inform the patient that if he wishes to be permanently cured, he must seek the help of the surgeon. It is the physician's duty to build up the patient for the operation; but it is not his duty to keep him from the surgeon. Some indications are positive for surgical interference: obstruction, repeated hemorrhages, and severe pain, or when, on account of disturbed digestion, the patient is insufficiently nourished. The relative indications are when, on account of any of these conditions, the patient is unable to maintain a good physical state on the food which circumstances permit him to obtain, or when his chronic disability interferes with his vocation (Mayo).

A study of the symptomatology and pathology of gastric and duodenal ulcers demonstrates that the greater number are situated within 2 in. of the pylorus, and that all these ulcers give a fairly definite clinical picture; pain coming on from one to three hours after meals, often at night, and relieved by taking food, alkalies, etc. In the early stages hyperacidity is a fairly constant symptom; although, when there is obstruction or the disease exists in individuals in the later decades of life, the acidity may be normal or below. Hypersecretion, giving rise to sour belching and eructation of acid fluids, is a prominent feature and one that is more persistent than hyperacidity. Hemorrhage, both obvious and occult, is less important in the diagnosis than we were led to believe; and so far as hematemesis is concerned it can only be accepted as indicative of chronic ulcer, when it is preceded and followed by other symptoms of ulcer. The most important diagnostic sign is food retention, not necessarily gross obstruction, but the finer degree of obstruction causing small particles of food to be found in the stomach eight, ten and twelve hours after meals. Other things being equal, food retention is an indication for surgical interference. A differential diagnosis between duodenal and gastric ulcer can usually be made without difficulty, but is not essential. It is generally observed that the location of the lesion is usually duodenal if there is a long interval between food and pain, and especially if the point of pain is a little to the right of the median line, as well as in the epigastrium (Mayo). The best results from operation are obtained before there is any marked gastric dilatation, and it appears that in those cases where the ulcer is in, or very near, the pylorus and the opening is obstructed by scarring, the most brilliant results are obtained from gastroenterostomy.

Certain operators have advocated and practised closure of the pylorus by suture, and frequently inversion or excision of the diseased area will result in practical occlusion of the normal passage. An artificially produced occlusion is, however, not indicated (Bishop). Moynihan, as we stated before, believes chronic duodenal ulcer always surgical. He has never operated on a case until after the second attack, and always has found the serous coat involved and the lesion easily located. The procedure to be adopted in operation will depend on conditions disclosed at the time the lesion is examined. In the great majority of cases gastroenterostomy is most satisfactory, but in order that it should give, not only

immediate, but also permanent relief, the ulcer must be so large as either in its present form, or by the time healing is complete in it, to offer obstruction, or means must be taken to secure the infolding of the ulcer. If the ulcer is small, placed on the anterior surface of the duodenum, and free from adhesions, it may safely be excised, and the wound in the duodenum closed. If the ulcer is large and indurated, occupying perhaps more than half the circumference of the gut, or if multiple ulcers are found, or two ulcers of the "kissing" variety, then gastro-enterostomy will be necessary. If the ulcer is associated with a chronic gastric ulcer near the pylorus, and perhaps in other circumstances, the resection of the affected area may be necessary.

The removal of an ulcer is always desirable. Should the ulcer be small, the scar from the healing will be inconspicuous. The situation near the pylorus, either in the stomach or duodenum, causes a pyloric spasm. After gastro-enterostomy, the stoma remains patent and active as long as the irritation of the ulcer causes the pylorus to close the natural exit. On the healing of the ulcer, due to the proper drainage, the pylorus again opens and the ulcer is subject to renewed irritation and breaks down, and the last state of the patient is the same as the first, except that the artificial stoma may have closed while the pylorus was again patent. In such a case, either excision of the ulcer is necessary, or an infolding of the ulcer, which as Mitchell has shown has the same effect as excision. Infolding or excision may so narrow the lumen as practically to exclude the pylorus. Excision of the duodenal ulcer can be safely performed only when the wound, which remains after removal of the ulcer, can be sutured without any present or future risk of narrowing unless at the same time a gastro-enterostomy is performed.

In excising small ulcers of the duodenum without gastro-enterostomy, the ulcer is removed together with a horizontal or longitudinal ellipse; and the closure is made by drawing the sides of the ellipse apart to make a vertical or transverse wound. The cases in which excision, with or without pyloroplasty, was done were not so satisfactory as those treated by gastro-enterostomy; and two of Mayo's cases required secondary gastro-enterostomy before a cure was established. The explanation of the failures from excision appears to lie in the fact that after plastic operation about the pylorus, crippling adhesions are likely to follow, and while an adequate opening can be made, the progress of food is apt to be delayed and painful. In Mayo's hands the gastroduodenostomy of Finney gave better results than pyloroplasty, and the late results following Finney's operation were excellent. Here it may be well to call attention to Bishop's advice, that in perforating ulcers mere closure of the perforation at the time may be all that is practicable, but, if possible, gastro-enterostomy should also be done at the same operation.

The trend of stomach-ulcer surgery is to excise all ulcers where it is possible, because in every ulcer there is prospect of later carcinomatous development. Mayo, after having 263 resected tissues examined, found that 71 per cent. of the gastric cancers had developed on gastric ulcers. These findings have led to the conviction that chronic calloused ulcer of the stomach is best treated by excision, and in excising, if mechanical conditions are created which interfere with the progress of food, gastro-enterostomy should also be done. For ulcers at the pylorus, Rodman's operation of partial gastrectomy, with complete closure of the end of the duodenum and stump of the stomach, and independent gastro-enterostomy (Billroth, No. 2), is a most useful procedure. In saddle ulcers excision may ordinarily be performed without difficulty, and likewise excision or

Maury's excision be used for ulcers of the anterior wall of the stomach. For inaccessible calloused ulcers of the posterior wall of the stomach, Mayo has urged an operation, first suggested by Pilcher, of incising the anterior wall and through this opening obtaining access to the ulcer on the posterior wall.

The operation of gastro-enterostomy has reached the stage of development where the no-loop posterior operation is accepted, the discussion resting now largely on minor details of the type of suture, or whether the jejunum should pass from above downward or slightly obliquely from the right downward toward the left, following respectively the method of Mayo or Moynihan. Finney believes that it matters little whether the jejunum points to the right or left, so long as the loop of jejunum is not rotated on its long axis at the point of union with the stomach wall; for, if it is so rotated, a valve-formation with obstruction is very likely to be produced thereby.

In summing up the end results after operation for ulcer, we have a concensus of opinion that in gastro-enterostomy in skilled hands, the mortality in operations on all classes of cases is low: about 2.15 per cent. in Moynihan's tables of 186 duodenal ulcers and 2.4 per cent. in Mayo's report on 1000 gastric and duodenal ulcers.

Bamberger studied 836 cases, operated by various men at various times in the development of gastric surgery, and found a mortality of 12.2 per cent. to which he adds a late mortality from complications of 5 per cent. Dunham, in the 48 cases he has studied, operated by various men, gives a mortality of 25 per cent., but from the fact that 5 of his cases died from shock, and 3 from viscious circle, we would judge that the operators were hardly qualified for gastric surgery. Another of his cases died from a gangrenous appendicitis, developing fifteen days after a perfect healing of the gastro-enterostomy.

Of those cases recovering from operation the end results are reported by two classes of observers—the surgeon and the physician—the latter requiring of the patient an unqualifiably favorable answer to the questions: Are you still having trouble with your stomach? do you have any belching of gas or food? do you vomit at all? have you passed any blood? how is your appetite? are your bowels regular? Even with such rigorous searching, Dunham gave 15 perfect recoveries in 24 cases, 4 so-called recoveries where care was required as to choice of food, 3 cases improved, and 2 cases unimproved. Pain and vomiting cease from the time of operation, and the patient regains the power of taking the requisite amount of food and of digesting it. The results for 186 duodenal ulcer cases, operated by Moynihan, show 4 deaths from operation. Four died at varying periods from other causes than operation, 147 or 79 per cent. were cured, 18 or 9.6 per cent. are improved (they have in part occasional regurgitant vomiting, or flatulence, or pain), one case of doubtful improvement, one case that is no better, and 11 cases not traced. The results from the Mayo clinic indicate that the treatment of all duodenal and all obstructing ulcers of the pylorus by gastrojejunostomy and excision, or infolding the ulcer, is satisfactory; and they give 98 per cent. of cures or great improvement. Eighty-five per cent. of ulcers of the body of the stomach will either be cured or greatly relieved by excision, or devitalizing suture compression with gastrojejunostomy. In addition, closure of the pylorus may be practised with benefit. The remaining 15 per cent. will be more or less benefited, and none has been made worse by operation.

DIAGNOSTIC AND THERAPEUTIC NOTES.

TREATMENT OF ESOPHAGEAL CARCINOMA.—Liebermeister (*Muench. med. Wochenschr.*, 1911, No. 38). The usual palliative treatment of esophageal stenosis, due to carcinoma, by means of esophageal sounds, is often productive of as much harm as good. Liebermeister suggests the use of a 1-2 per cent. solution of hydrogen peroxide. A swallow or two of this is taken every hour. It cleans the ulcerating surfaces and assists in the removal of necrotic material so that not infrequently absolute stenoses are made permeable for a time. In addition he advises the use of narcotics, olive oil, and occasional periods of exclusive rectal alimentation.

JEJUNAL AND GASTROJEJUNAL ULCERS.—Mayo-Robson (*British Med. Journ.*, January 6th, 1912). These ulcers, in the opinion of the writer, develop not infrequently and sometimes unavoidably after gastro-enterostomy, never spontaneously. Usually they are due to the fact that sufficient care is not exercised in dieting patients, who have undergone the operation of gastro-enterostomy, so that hyperchlorhydria and sepsis combine to produce ulceration. The dangers of jejunal ulcer arise, not only from painful indigestion (the pain simulating that of duodenal ulcer, only varying in position), but also from a recurrence of symptoms of ulcer, often associated with hemorrhage and not infrequently ending in perforation. If, after a period of good health subsequent to the operation of gastro-enterostomy, a patient begins to complain of acidity, flatulence, and discomfort after meals, followed after a time by definite pain from an hour or two to three hours after food, and relieved temporarily by taking milk or some other light diet, or some form of alkali such as sodium carbonate; if the pain occurs on the left of the umbilicus and is associated with marked tenderness and rigidity of the left rectus; the suspicion of ulcer of the jejunum will arise. The complication of hematemesis or melena, or even the presence of occult blood in the feces, will make the diagnosis fairly certain; but if, with all these symptoms, a swollen and tender loop of bowel can be felt in the region of the anastomosis, or below and to the left of the umbilicus, the surgeon can no longer be in doubt as to the nature of the disease. He has devised a means of treating the condition which seems to give excellent results. If the old ulcer, for which the primary operation was performed, has healed he detaches the jejunum from the stomach, excises the existing ulcer, and closes both stomach and jejunum. If this is impossible, or if the food cannot resume its old channel, he excises the gastrojejunal or jejunal ulcer, and, after making a new gastro-enterostomy, he attaches the jejunum to the anterior abdominal wall and introduces, through a jejunostomy opening, a small catheter through which the patient can be fed for an indefinite time. This puts the stomach at rest and allows

restoration to normal and uninterrupted healing of the stomach and jejunum. The operation is also applicable in the following conditions: (1) Extensive cancer of the stomach; (2) general cicatricial contraction of the stomach; (3) chronic and even acute gastric ulcer; (4) chronic duodenal ulcer; (5) in jejunal and gastrojejunal ulcer when the patient is too ill for the more extensive procedure; (6) in persistent vomiting which threatens life.

EARLY X-RAY DIAGNOSIS OF CANCER OF THE LARGE BOWEL.—Haenisch (*Muench. med. Wochenschr.*, 1911, No. 45). An enema, consisting of 75 grm. bismuth, 300 grm. bolus and 1 litre of water, forms a fairly permanent suspension that in normal cases can easily be made to traverse the entire extent of the large gut. A fluoroscopic examination after such an enema shows the size, shape and position of the lumen of the bowel very accurately. Both inflow and outflow of the enema should be watched by means of the screen. The position of palpable tumors can thus be accurately localized, and stenoses, palpable or otherwise, can be clearly made out. The latter reveal themselves as constricted areas in the bismuth shadow with a permanent greater dilatation of the proximal as compared with the distal portion of the gut. In marked stenosis, the bismuth suspension may fail to pass beyond the stenosis. It must be remembered, however, that colonic spasm or kinking may give pictures identical with those produced by an organic stricture. Prolonged observation, however, usually enables one to distinguish between the conditions, the spasm or the kink eventually permitting the bismuth suspension to flow by, whereas a malignant stenosis offers a permanent barrier. An advantage of the bolus suspension is that it allows the outflow of the enema through the rectal tube at the close of the observation, thus obviating the disagreeable deposit of large masses of bismuth in colon and cecum.

THE "PAIN SIGNAL" IN THE DIAGNOSIS OF APPENDICITIS.—Leven (*Presse méd.*, 1911, No. 49). Various gastric affections may give rise to abdominal pain and tenderness that may simulate chronic appendicitis. They may be differentiated from the latter by the occurrence of what the writer calls the pain-signal (*douleur-signal*), which is based upon the observation that abdominal hyperesthesias, dependent upon gastric dilatation, cease when the stomach is elevated. The patient stands in front of, or to the right of the physician. The latter exerts deep pressure upon the abdomen just above the symphysis and then carries this pressure upwards towards the epigastrium. If both pain and tenderness cease as the pressure is carried upwards, returning when the pressure is relaxed, the condition is one of gastric hyperesthesia and there is no involvement of the appendix.

THE DILATATION TEST FOR CHRONIC APPENDICITIS.—Bastedo (*Amer. Journ. Med. Assoc.*, 1911, No. 6). A valuable method for the diagnosis of obscure cases of chronic appendicitis consists in the insufflation of air into the colon. If this procedure results in the production of localized

tenderness at McBurney's point, the diagnosis of appendicitis is justified. In cases of chronic appendicitis, areas of tenderness to pressure are often found elsewhere than at McBurney's point. After colonic insufflation, however, these usually disappear, whereas the tenderness at McBurney's point becomes exaggerated. The method is especially useful for the differentiation between appendicitis and disease of the right adnexa.

The writer reports 6 cases that illustrate the value of his method. Whenever the test is positive, he operates, and the operation has always confirmed the diagnosis. A negative result of the test does not, however, exclude appendicitis. In 2 such cases the diagnosis was established later by an acute attack. In acute appendicitis, the method is obviously contra-indicated.

———

CANCER OF THE RECTUM AND ITS TREATMENT.—Mummery (*Lancet,* December 30th, 1911). Cancer of the rectum often arises from a benign growth in the bowel, such as a polypus or simple adenoma, usually spreading by the lymphatics and by direct extension. Metastasis does not apparently occur early. The earliest symptoms are a tendency to looseness of the bowels, a feeling as if the bowel were not completely emptied after an evacuation, and bleeding. Constipation is not as a rule an early symptom except in cancer high up in the bowel or in the large intestine, and even then it is uncommon. Other common symptoms are pain or discomfort in the sacrum and pain in the lower part of the abdomen. As regards the indication for operation, the author states that mere fixation of the growth does not always contraindicate removal. Extensive secondary glands, fixation by extension to other important organs, nodules in the liver, and the size or connections of the growth rendering it mechanically impossible to remove it, are, of course, contraindications.

———

RELATION OF CHRONIC APPENDICITIS TO COLITIS.—Tyrode (*Boston Med. and Surg. Journ.,* January 4th, 1912). The writer calls attention to the frequent coexistence and interrelation of colitis and appendicitis. He does not discredit operations for chronic appendicitis, but merely pleads for more thorough attention to the colon before rushing chronic cases to operation. He also emphasizes the great necessity of after-treatment of the colon in cases of chronic appendicitis associated with colitis, a large proportion of which cases are so associated. He condemns most strongly the removal of the appendix through the smallest possible opening and the failure to explore the whole abdominal cavity when there have been chronic symptoms.

CORRESPONDENCE

PARIS LETTER.

PATHOLOGY OF THE SPLEEN.

By Auguste A. Housquains, M. D.

Until recent times the pathology of the spleen was in a rudimentary stage; we knew that in the course of certain diseases this organ was increased in volume; we were aware of the fact of the existence of splenic tumors; but the symptomatology of the spleen did not, so to say, extend beyond the ascertaining of its density, more or less pronounced, which was revealed to us by percussion. Hematological researches, however, have completely altered our point of view in regard to the study of the pathological changes of the spleen and have been the means of formulating our various ideas and theories into a satisfactory semiology. The classification of splenomegalias is, in fact, based on the verification of abnormal forms of white corpuscles, on the increase in their number, and on the more or less fragility of the red corpuscles.

When enlargement of the spleen was first studied by physicians, the laboratory researches were thought sufficient to explain the pathology, and, to a certain extent, the theory; but at the present time a laboratory explanation no longer suffices. In fact, the examinations which were made in the laboratory and which were the basis of diagnosis of splenic disease, resulted in the question whether this disease corresponded to a hematological formula. In the majority of cases, the clinical symptoms correspond to this formula, since the results yielded by the examination of the blood are in accord with the clinical syndrome. In a large number of cases, it can be stated with certainty, the clinical syndrome suffices in the matter of diagnosing splenic disease even before hematological researches have been made. Thus, for example, in the affection so perfectly described by Vaquez and known by the name of erythremia, it has been possible to assert that the cyanotic discoloration of the skin, the intense pain which assails the lower extremities, the hypertrophy of the spleen and also its indurations are characteristic symptoms that foretell what the results will be from an analysis of the blood—considerable increase in the number of the red corpuscles and the hemoglobin. We also know that when we are able clinically to demonstrate an increase in the volume of the spleen, when the increase is so enormous that the organ descends to the iliac spine, filling almost the left half of the abdomen, the examination of blood will show the characteristic formula of myelogenetic leukemia.

Even though the clinical syndrome and the analysis of the blood are

in full accord, it would be wrong to conclude that the examination of the blood is an undertaking that is always superfluous; such a deduction would be too sweeping. The truth is that research in the matter of a hematological formula is an absolute necessity. It is extremely easy of performance even though one may not have at his disposal the resources of a laboratory. All that is necessary is to collect one drop of blood on a slide, spread it out by means of another slide, place the preparation for a few minutes in a mixture of alcohol and ether, and send the slides to the nearest laboratory. The results obtained by this sort of examination have a value which cannot be denied in so far as it concerns the diagnosis of diseases of the spleen. Besides furnishing the elements of a scientific diagnosis, it is indicative of the prognosis, and shows us what line of treatment to follow. In the case of myelogenetic leukemia, for example, the physician should give a grave prognosis, and should begin the only therapeutic measure at present having beneficial results in what was formerly thought to be incurable—namely, radiotherapy. In the same way, when the diagnosis of erythremia has been made, the prognosis should be regarded as a very serious matter, and the remedy, which is the most efficacious at present in the therapeusis of pain in this disease—antipyrine—should be administered.

Despite the fact that this disease is not completely understood at the present time, it is nevertheless possible to arrange, in a methodical fashion, the salient points in the pathology of the spleen by classifying the habitual causes and determining their frequency.

The diseases of the spleen may be divided into those which are primary, and those which are secondary to alterations in the blood and the hematopoietic organs. By primary diseases of the spleen the reader should understand those in which this organ has reacted for the first time in consequence of an auto-intoxication or of an infection.

The arterial blood is supplied to the spleen by the general circulation; hence the blood with which the spleen is furnished through the splenic vessels, as well as the lymph, constitutes the two means of contaminating this organ.

There are in particular certain chronic infections, such as syphilis and tuberculosis, which attack the spleen in consequence of a septicemia not localizing in other viscera. At the present time we know of a large number of cases of primary tuberculosis of the spleen, and syphilitic splenomegalias are far from rare. Infectious diseases may cause tubercles, caseous masses and gummata; they may also cause, in the spleen, an amyloid degeneration. In all these cases it is through the general circulation that the infection takes place; but it is probable that these cases are more frequent when the splenic vein and the lymphatics are the means of carrying the poison to the spleen. The intestinal route is certainly an important factor in producing the toxic and infectious agents which cause splenomegalias; but, at the same time, it is necessary to recognize that the secondary splenomegalias are much more frequent. They can be seen in all toxi-infections of the spleen through the intermediary of alterations in the blood. Splenomegalia, due to paludism, may be considered as the most common type of this group. We know that the acute attacks manifest themselves by an increase, sometimes very considerable, in the volume of the spleen; that under the influence of treatment by quinine this tumefaction disappears rapidly, but that when the attacks are repeated a certain number of times, the diminution in the volume of the organ is less accentuated; and that splenomegalia ends by becoming

a permanent state, finally constituting a veritable paludal cirrhosis. Although less typical in their splenic manifestations, other infectious diseases are known to affect the structure of the spleen in a manner not less habitual. All acute infectious diseases are capable of altering this organ. The mechanism of this alteration appears to be complex. It is not only the poison, which is carried by the infection to the spleen, that should engage our attention, but especially the splenic reactions which follow alterations in the red corpuscles and the accumulation in the spleen of these altered corpuscles.

Splenic anemias are explained in this manner: Splenomegalia is due, for the greater part, to the accumulation of broken-down red corpuscles.

In the group of secondary splenomegalias, mention should be made of erythremia, known as Vaquez's disease, and also leukemic splenomegalia. An important group of splenomegalias is the one which stands in relation to diseases of the liver. The splenic reactions from hepatic affections are much better understood to-day on account of the enlightening studies of Gilbert and Chauffard. Nevertheless, this matter is one of so complex a nature that further study will be necessary before a complete understanding is effected. Be that as it may, we can say with certainty that in a certain number of cases the increase in the volume of the spleen and the liver results from a common cause, either infection or auto-intoxication, and that one enlargement is not subordinate to the other. It is evident, for example, that in typhoid fever an infectious endocarditis can cause alterations simultaneously in the liver and the spleen. But in certain cases, it has been well established that splenomegalia is of hepatic origin. Gilbert and Lereboulet have written on this subject extensively, and their ideas are incorporated in the thesis of Villaret. In the case reported by Villaret, the hypertrophy of the spleen was due to obstructive circulation in the portal vein; and this obstruction caused an accumulation of blood in the organs tributary to the portal circulation. The truth of this mechanism cannot be doubted. Experimentally, Castaigne has already shown that, when the portal vein in experimental animals is ligated, the autopsy reveals enormous spleens engorged with blood. By analogy, it can be said with truth that a pathological obstacle to the portal circulation acts in the same way as a mechanical obstacle. Nevertheless, it is absolutely necessary not to be too positive and not to say that splenomegalia is due exclusively to an obstacle in the circulation of the portal vein; other influences are without doubt of equal importance in causing this disease.

Inversely, there are certain hepatic reactions which have their origin in the alteration of the spleen. The remarkable researches Chauffard have made this matter one of the questions of the day in medical circles. In a certain number of cases this cannot be doubted, since the splenic vein carries towards the liver the substances which were deposited in the spleen through the circulation. Hence, these toxic substances coming from the spleen can, in turn, affect the liver. Anatomico-clinical experiments and observations have established this fact.

Hemolytic icterus might at the present time be classed in this group, but it behooves us to say that all authors are not in accord as to the manner in which we ought to interpret the participation of the spleen in the production of icterus. According to Chauffard, the fragility of the corpuscles is the criterion of icterus; the spleen destroys the fragile red corpuscles and sets free an excess of hemoglobin; and it is the hemoglobin, when it arrives at the liver, that produces the excess of bilirubin.

Icterus is therefore of a splenohemolytic nature. According to Widal, icterus is exclusively of hematogenic origin. The fragile corpuscle is destroyed in the blood by a poison of which the cause is often undetermined; hence, bilirubin is formed directly in the circulation without any intervention on the part of the blood or the spleen. According to Gilbert, the fragility of the red corpuscle has not the importance that Chauffard and Widal attribute to it. He maintains that the diminution in the resistance of the red corpuscle in a hypochloride solution does not represent the essential condition in icterus due to hyperhemolysin.

There are three theories outlined in the following manner by Castaigne: (1) Widal's—the red corpuscle is rendered fragile and is destroyed in the blood, and it is in the blood that the bilirubin produces icterus without the intervention of the liver or the spleen; (2) Chauffard's—the red corpuscle is rendered fragile in the blood and destroyed in the splenic parenchyma; (3) Gilbert's—the spleen from the beginning not only destroys, but renders the red corpuscle fragile.

To sum up, this is, broadly speaking, the present status of the question according to the French School of Medicine. Further researches will be necessary to clear up a number of obscure points; but, even so, we must recognize the fact that the laboratory has supplied the clinic with a firm and workable scientific basis by its labors on behalf of the pathology of the spleen.

February 10th.

SOCIETY PROCEEDINGS.

ST. LOUIS MEDICAL SCIENCE CLUB.

The regular meeting of the St. Louis Medical Science Club was held Tuesday evening, February 13th, at the St. Louis Skin and Cancer Hospital, with the President, Dr. Leo Loeb, presiding. The program included the following communications:

1. The Arteries of Polyodon..................Dr. Charles Danforth.
2. An Experimental Study of the Arteries in Shock.
<div align="right">Dr. Willard Bartlett.</div>
3. Further Investigation of the Virulence of Desiccated Rabies Virus.
<div align="right">Dr. D. L. Harris.</div>
4. Observations on the Pharmacology of Vanadium Compounds.
<div align="right">Dr. D. E. Jackson.</div>

Abstracts of these papers follow.
<div align="right">(Signed) W. E. GARREY, Secretary.</div>

THE ARTERIES OF POLYODON.
By C. H. Danforth, M. D., of St. Louis.

The heart is interesting in its very asymmetrical sinus, and in the large amount of lymphoid tissue which envelops the ventricle and conus arteriosus. The conus is of a transitional type and may have either three or four valves, each with a variable number of cusps. All the afferent branchial arteries produce ventral recurrent branches and, excepting the fourth, terminate in dorsal bifurcations. The efferent vessels are essentially of the teleostean type. Hypobranchial arteries are well developed, but they do not give rise to coronary branches, a peculiarity in which polyodon seems to be unique. The artery to the heart is a posterior coronary which has an unusual origin from the fourth efferent branchial artery in the roof of the mouth, and in a measure replaces a vessel which in elasmobranchs arises from the subclavian. At the point where it enters the pericardium, it gives rise to branches which follow the hepatic veins into the liver and from the arterial blood-supply of the anterior part of that organ as well as a variable portion of the gall-bladder. For these vessels the term *anterior hepatic arteries* is suggested. Posterior (the ordinary) hepatic arteries are also present and may anastomose with the anterior vessels.

EXPERIMENTAL STUDY OF THE ARTERIES IN SHOCK.
By Willard Bartlett, M. D., of St. Louis.

This study was undertaken to determine if possible whether the arteries are dilated or constricted in shock in the dog. As you very well know, surgeons are divided into two camps on this subject; and it appeared to

us that the direct method of measuring the rate of inflow into the arteries might determine definitely this question.

An apparatus was constructed by the use of which salt solution, under a pressure higher than any obstacle in the veins could offset, was injected peripherally into the arteries, first, with the dog in the normal state, and after the dog had been reduced to shock, the inflow being measured in cubic centimetres by a stop-watch.

The femoral artery was taken in about half of the experiments, and the splenic artery in the other half. The blood-pressure of the animals was reduced by various kinds of traumatism, which, however, did not involve the area into which the salt solution was injected.

The results obtained justify us in concluding that vasodilatation is unmistakably an accompaniment, if not the result, of shock. Every experiment coincided with all others. The average rate of inflow was more than 26 per cent. greater in the shocked than in the normal animal. All these results being alike, we may conclude that we were not dealing with an accidental finding.

In our experimental work, it was highly interesting to find that the arteries do not behave in the same way in shock and in hemorrhage. I have heard surgeons say that in cases of shock, so-called, they have found the belly full of blood. We found that when the animals were reduced to a state of shock, the rate of inflow of salt solution into the artery was greatly increased, 26 per cent., over the normal, and there was no apparent attempt on the part of nature, when the dog was thoroughly shocked, to combat this vasodilatation. We bled a few dogs in order to hasten the fall of pressure, and found that the bleeding immediately decreased the rate of inflow; evidently vasoconstriction ensued even when the bled animal was in a state of shock. In shock itself without bleeding, that does not occur.

I may say to practical surgeons that the use of morphine in these experiments exerted absolutely no influence in inhibiting shock.

FURTHER STUDIES ON THE PROPERTIES OF DESICCATED RABIES VIRUS.

By D. L. Harris, M. D., of St. Louis.

Since the work of Pasteur on antirabic immunization, many investigators have endeavored to lessen the labor necessary to keep this material on hand and ready at all times. In laboratories, where this treatment is given, rabbits must be continually inoculated, and the cords dried from day to day whether the patients be many, few or none.

The present method preserves the virulence of this material for several months with negligible alteration and permits the treatment to be given with a minimum amount of labor and expense.

When cords from rabbits inoculated with fixed virus are dried according to Pasteur's method, virulence diminishes from day to day until, on the eighth day, it is lost entirely. If, however, these cords be frozen with CO_2 snow and dried in vacuo after the method described by Shackell, and by Harris and Shackell, the desiccated material contains from 30 to 50 per cent. of the original virulence; and when kept in a cool, dark place, free from moisture, its loss of potency is so slow that during three months' preservation it does not lose more virulence than cords do after twenty-four hours of drying by Pasteur's method.

Experiments made show conclusively that with this dried material, dogs and rabbits are readily immunized by the dilution method of Högyes or the "unmodified" method of Ferran. Its efficiency has been determined by a number of experiments on both animals and men.

OBSERVATIONS ON THE PHARMACOLOGY OF VANADIUM COMPOUNDS.

By D. E. JACKSON, M. D., of St. Louis.

When administered intravenously the chief action of vanadium is expended on the vascular system. The central nervous system has but little influence on this action, for the rise in blood-pressure, produced by injection of vanadium into an animal whose head has been removed from the body, is almost identical, both in character and extent, with the rise produced by injection of the metal into a normal (etherized) animal. With ordinary doses the mammalian heart is but little affected. The vagus endings in the heart remain active throughout the whole course of the intoxication in the intact animal. Batrachian and chelonian hearts seem to be more directly affected by the element than is the mammalian heart. An intense peripheral vasoconstriction is produced by the metal in the spleen, kidneys and intestines. In the intact animal the cutaneous and muscular vessels dilate from visceral displacement of the blood, but in perfusion experiments the limb volume also decreases slightly under the action of vanadium. The view held previously that the rise in general blood-pressure was due to a strong stimulation of the medullary vaso-constrictor centre is wholly wrong. The peripheral constriction is due to a localized action within the organs themselves. It occurs in a perfectly normal manner in the excised organs of animals, whose general blood-pressure has fallen to zero under large doses of the metal. With repeated intravenous injections of the same-sized doses into an intact animal, the rise in blood-pressure following each injection regularly decreases until at length a fall will be produced by each injection. This is due first to weakening and paralysis of the vasoconstrictor centre, and, secondly, to a direct depression of the heart. With a moderate dose the maximum rise in blood-pressure will be produced, and a further increase in the size of the dose will not give any greater rise in the pressure. This seems due to the fact that a moderate dose gives the maximum contraction of the visceral vessels, and a larger dose does not produce any corresponding constriction of the remaining vessels of the body. The peripheral action of vanadium on the visceral vessels is very much greater than that of barium. With doses of adrenalin and of vanadium so adjusted that each will give the same rise in general blood-pressure, the vasoconstriction in the kidney, spleen and intestine produced by vanadium will be very much greater in extent and duration than that produced by the adrenalin.

There is an increase in the peristaltic movements of the intestines, but the local application of vanadium to a loop of intestine does not cause a local anemia or a constriction of the bowel-wall as occurs with barium. These two elements also differ widely in their action on the heart. Smooth muscle, except the vessels and alimentary canal, does not seem to be affected by the metal. In toxic doses the metal acts on the kidneys and gastro-intestinal canal in a manner similar to that of other irritating metallic bodies.

BOOK REVIEWS.

FORTPFLANZUNG VERERBUNG RASSENHYGIENE. Herausgegeben von Prof. Dr. Max von Gruber, Vorstand des Hygienischen Instituts in Muenchen und Priv.-Doz. Dr. Ernst Ruedin, Oberarzt an der Psychiatrischen Klinik in Muenchen. Erklærender Text mit 230 Abbildungen von M. v. Gruber nebst einem Bibliographischen Anhang von Dr. Rudolph Allers. Zweite, ergaenzte und verbesserte Auflage. Munich: J. F. Lehmanns Verlag. 1911. Paper 3 m.; cloth 4 m.

In spite of the considerable amount of literature on the subject, race hygiene or eugenics, as it is often called, presents problems about which the general medical pubic knows little. The complex problems involved are presented by the authors with great clarity and in most interesting fashion. After discussing reproduction, variability, selection, mutation, inheritance and Mendelianism, they proceed to the problems of racial hygiene proper. The crux of the matter seems to be this: On the whole, the most competent members of the population tend to become prosperous. The prosperous classes, however, tend to reproduce themselves insufficiently, whereas the poor are notoriously fertile. New competent families tend to arise from the proletariat, but this process, as analogous observations in plants and animals show, has its limits. The present constitution of society thus tends to race degeneration.

The cure for this evil, proposed by the authors, and consisting essentially in prizes for large families among the so-called upper classes, seems ludicrously inadequate.

It seems clear to us that nothing but a complete revolution in our social organization, perhaps along the lines of socialism, can call a halt to this process. The book will well repay perusal and should be translated.

DIE ROENTGENTHERAPIE IN DER GYNAEKOLOGIE. Von Prof. Dr. Karl Reifferscheid. Oberarzt der Universitaets-Frauenklinik in Bonn. Mit 4 Tafeln und einem Anhang ueber die Roentgentechnik in der Gynækologie von Prof. Dr. Paul Krause, Direktor der medizinischen Poliklinik in Bonn. Leipzig: Johann Ambrosius Barth. 1911. Price, 4 m.

This monograph by Reifferscheid contains a complete exposition of the x-ray in gynecology and obstetrics. The volume is a result of Reifferscheid's individual studies and experimental researches, together with a critical review of the previous literature and a catalogue thereof. The chapter headings are as follows: (1) Histological Researches Upon the Influence of Roentgen Rays Upon Animal Ovaries; (2) Histological Researches Upon the Influence of Roentgen Rays Upon Human Ovaries; (3) Experience with the Therapeutic Use of Roentgen Rays in Gynecology; (a) Use of Roentgen Rays in Uterine Hemorrhage and Myomas; (b) Use of Roentgen Rays in Allied Gynecological Diseases; (4) Influence of the Roentgen Rays Upon Pregnancy; (a) Experimental Researches; (b) Observations in Women; (5) The Diagnostic Significance of the Roentgen Rays for the Obstetrician and Gynecologist. There is an appendix by Prof. P. Krause upon the Roentgen Technique in Gynecology.

The perusal of this monograph is suggested to those who have been interested in the recent development of this new field of Roentgen effort, since it is very comprehensive and satisfactory.

DIE NEUE WELT DER FLUESSIGEN KRISTALLE. Und deren Bedeutung fuer Physik, Chemie, Technik und Biologie. Von O. Lehmann, Professor der Physik an der Technischen Hochschule zu Karlsruhe. Mit 246 Abbildungen im Text. Leipzig: Akademische Verlagsgesellschaft m. b. H. 1911.

The discovery of the existence of fluid crystals has turned our notions of many facts in physics and chemistry topsy-turvy, so that the author's use of the expression "a new world" has its justification. These crystals, while fluid, possess many of the characteristics of ordinary solid crystals such as anisotropy and typical behavior towards polarized light. Their study has complicated some

problems of molecular physics and helped to explain others, besides apparently having no inconsiderable bearing upon the phenomena of cellular life.

The literature of the subject is extensive and widely scattered so that a systematic presentation of our present knowledge of it is to be welcomed, especially when coming from one of the most eminent contributors in this field. The book is profusely illustrated and will truly open "a new world" of ideas to anyone who has the courage and persistence to delve into this abstruse subject.

FURTHER RESEARCHES INTO INDUCED CELL-REPRODUCTION AND CANCER. Consisting of Papers by H. C. Ross, M. R. C. S. England, L. R. C. P. London, J. W. Cropper, M. B., M. Sc. Liverpool, and E. H. Ross, M. R. C. S. England, L. R. C. P. London. With Illustrations. The McFadden Researches. London: John Murray (P. Blakiston's Son and Company, Philadelphia). 1911. Price, $1.00.

The reviewer of this little book ought not to read the polemic prefacing the volume, nor ought he to be influenced by the rather vigorous protests of certain Englishmen against the authors. If he does not—and in this case he did not—allow prejudices to bias his judgment, he must admit that the volume is, to say the least, interesting. To an unbiased observer a new theory based on facts evolved by new technique should be received with an honest scepticism; from this point of view Ross' work can neither be accepted nor dismissed without more scientific evidence one way or the other. Even literary license does not permit us to deny the possible truth of even the most fantastic ideas; but, on the other hand, discriminating judgment does not permit us to accept conclusions which are not perfectly logical. We do not think that Ross' experimental data warrant his conclusions, but we are open for further evidence in the case.

MANUAL OF PATHOLOGY. Including Bacteriology, the Technic of Postmortems, and Methods of Pathological Research. By W. M. Late Coplin, M. D., Professor of Pathology, Jefferson Medical College, Philadelphia; Medical Director of the Jefferson Medical College Hospital; etc. Fifth Edition, Rewritten and Enlarged. With Six Hundred and Twelve Illustrations and Twelve Plates; Eleven of which are in Colors. Philadelphia: P. Blakiston's Son & Co., 1911. Price, $4.50.

The fifth edition of Coplin's Manual shows more, than a complete review, how its value was estimated. The fifth is changed from the former in many directions. Of course, the advance in knowledge has greatly changed former ideas, and new chapters are added on leprosy, thyroid, etc. The list of literature is very complete and gives easy access to the sources of information on detailed branches of pathology. The literary style is terse and clear; hence, it is a pleasure to read the author's deductions employed to illuminate somewhat obscure points. The practical instruction as to methods of pathological research represents the modern advances which the student of to-day demands in the latest expressions on pathology.

HAUTVERAENDERUNGEN BEI ERKRANKUNGEN DER LEBER. Von Sanitætsrat Dr. S. Jessner. Wuerzburg: Curt Kabitzsch. 1912. Price, 60 pf.

In this, the twenty-fourth pamphlet of his Dermatologic Lectures for Practitioners, Dr. Jessner takes up the subject of skin changes in hepatic disease. A considerable portion of the 23 pages is taken up by a consideration of icterus. He then takes up the various hepatic lesions that may be accompanied by skin changes and winds up by a consideration of xanthoma. The little monograph contains little that is new, but it presents in brief and compact form much that is elsewhere scattered about in textbooks and journals.

DIE FLEISCHLOSE KUECHE. Eine theoretische Einleitung und ein praktisches Kochbuch von Dr. med. Julian Marcuse und Bernardine Woerner. Munich: Verlag von Ernst Reinhardt. Price, 3 m.

There is a variety of conditions in which the use of meat is contraindicated in toto or at least as the main article of diet. In most families, where meat is stricken from the dietary of the patient, the latter seems condemned to a regimen of limited variety and palatability. That this is due entirely to culinary ignorance is well shown by this book, in which over 1,300 recipes are presented, all to be prepared without the use of meat in any form. A study of this aspect of dietetics is important for all physicians and nurses. Anyone interested in this field will find, in the book of Marcuse and Woerner, a mine of valuable information.

CLINICAL DIAGNOSIS. A Textbook of Clinical Microscopy and Clinical Chemistry for Medical Students, Laboratory Workers, and Practitioners of Medicine. By Charles Phillips Emerson, A. B., M. D., Late Resident Physician, The Johns Hopkins Hospital; and Associate in Medicine, The Johns Hopkins University; Professor of Medicine, Indiana University School of Medicine. Third edition. Philadelphia and London: J. B. Lippincott Co. Price, $5.00.

This, the third edition of Emerson's "Clinical Diagnosis," deserves unqualified praise. Careful selection has eliminated all methods of doubtful value, and those described are presented clearly and concisely. The book is far from being a mere compend, but is based upon the experience of many years in the laboratory. The book is an ideal one, both for teaching purposes and as a book of reference for the practitioner.

TRAITE DE DESINFECTION. Historique—Généralités—Législation—Agents et Appareils—Contrôle—Pratique de la Désinfection—Désinfection municipale et départementale—Stations de désinfection. Par François Coreil et Victor Deville, Directeur Médecin du Bureau d'Hygiène de la Ville de Toulon. Préface de M. A. Chassevant, Professeur Agrégé a la Faculté de Médecine de Paris. Paris: Librairie Médicale et Scientifique, Jules Rousset. 1911. Price, 16 fr.

If a treatise on disinfection should contain everything that anybody might ever want to read on the subject, this book must be considered excellent. It covers the subject from every possible standpoint; it reviews history, it gives the laws controlling disinfection, it tells who is to disinfect, what is to be used and why, when disinfection is to be carried out,—and it has 146 illustrations of instruments and methods! Anyone who has to contend with the problem of disinfecting—and all physicians must meet the problem at some time—will find this volume a source of information apparently reliable, certainly complete.

BIOLOGIE MINERALE. Par René Schwaeblé, ouvrage orné d' un hors texte. Paris: H. Daragon. 1911. Price, 2 fr.

One wonders whether the author did not write this booklet with his tongue in his cheek. From various observations, in which inorganic matter shows phenomena superficially resembling those of growth and reproduction, the author concludes that minerals are quite as truly alive as plants and animals. An example of his experiments, taken at random, will show the quality of the work: "Put some oil of turpentine into sulphuric acid. In this dissolve some copper. The copper disappears, being replaced by another metal." Lovers of the pseudo-occult will find the booklet interesting.

THE TAYLOR POCKET CASE RECORD. By J. J. Taylor, M. D. Copyrighted 1911 by the Medical Council Company. Philadelphia: The Medical Council Company. 1911.

This book supplies a convenient form for a condensed record of each important case, in pocket size, so that the practitioner can have it always with him. It is so arranged that the necessary data can be written down in the briefest possible time—preferably while the examination is actually being made. The blank for the first thorough examination, diagnosis and treatment is followed by spaces for sixteen subsequent visits. The book provides for 120 cases.

THE HOUSE-FLY—DISEASE CARRIER. An Account of Its Dangerous Activities and of the Means of Destroying It. By L. O. Howard, Ph. D. New York: Frederick A. Stokes Co. Price, $1.60.

Anything published by Howard is of a character both scientific and practical. His book on the house-fly is intensely interesting by giving advices important scientifically and educationally for the public as to hygiene and cleanliness in their life. The book ought to have a wide circulation.

UEBER CAISSONKRANKHEIT MIT PATHOLOGISCH-ANATOMISCHER BESCHREIBUNG EINES FALLES. Von Dr. Ernst Stettner, Nuernberg. Wuerzburger Abhandlungen, etc. XI Band, 12 Heft. Wuerzburg: Curt Kabitzsch (A. Stuber's Verlag). 1911. Price, 85 pf.

A complete description of the etiology, symptomatology and pathology of caisson disease is followed by an exhaustive report of a typical case. The autopsy findings are described in detail and are of special interest.

BOOKS RECEIVED

COMMON-SENSE DIETETICS. By C. Louis Leipoldt, F. R. C. S., Eng. London: Williams and Norgate. 1911. Price, 2 s. 6 d.

TRANSACTIONS OF THE AMERICAN CLIMATOLOGICAL ASSOCIATION. For the Year 1911. Volume XXVII. Philadelphia: Printed for the Association. 1911.

DAS ROENTGENVERFAHREN IN DER CHIRURGIE. Mit 55 Figuren auf 4 Tafeln und 17 Figuren im Text. Von Dr. Alban Koehler, Spezialarzt fuer Roentgenologie in Wiesbaden. Berlin: Verlag von Hermann Meusser. 1911.

NASE UND AUGE IN IHREN WECHSELSEITIGEN PATHOLOGISCHEN BEZIEHUNGEN. By Professor Dr. A. Brueckner, Oberartz der Universitaets Augenklinik zu Koenigsberg i. Pr. Mit 5 Figuren im Text. Wuerzburg: Curt Kabitzsch: 1911. Price, 1.70 m.

SIR JOHN BURDON SANDERSON. A Memoir by the Late Lady Burdon Sanderson. Completed and Edited by His Nephew and Niece. With a Selection from his Papers and Addresses. Oxford: At The Clarendon Press (Oxford University Press, New York). 1911.

RECUEIL DE MEMOIRES D'UROLOGIE, MEDICALE ET CHIRURGICALE. Préface de M. F. Guyon. Publiés par MM. F. Widal,—Pousson,—Legueu,—Carlier,—Rafin, — Bazy,— Marion,— Desnos,— Michon,— J. Janet,— Jeanbrau,— Heitz-Boyer. Paris: Masson et Cie. 1911. Price, 5 fr.

SURGICAL CLINICS OF JOHN B. MURPHY, M. D., at Mercy Hospital, Chicago. Volume I, Number I. Octavo of 133 pages, illustrated. Published Bi-Monthly. Philadelphia: W. B. Saunders Company. February 1st, 1912. Price per year: paper, $8.00; cloth, $12.00.

SYPHILIS FROM THE MODERN STANDPOINT. By James McIntosh, M. D. (Aberd.) Grocers' Research Scholar and Paul Fildes, M. B., B. C., (Cantab.) Assistant Bacteriologist to the London Hospital. Illustrated. London: Edward Arnold (Longmans, Green and Co., New York).

SURGERY AND SOCIETY. A TRIBUTE TO LISTERISM. By C. W. Saleeby, M. D., F. R. S. E., Fellow of the Obstetrical Society of Edinburgh; formerly Resident Physician Royal Infirmary and Resident Surgeon Maternity Hospital of Edinburgh. New York: Moffat, Yard and Company. 1912. Price, $2.50.

HANDBOOK OF PHYSIOLOGY. By W. D. Halliburton, M. D., LL. D., F. R. C. P., F. R. S., Professor of Physiology, King's College, London. Tenth Edition (being the twenty-third edition of Kirkes' Physiology). With nearly Six Hundred Illustrations in the Text, many of which are Colored, and Three Colored Plates. Philadelphia: P. Blakiston's Son and Co. 1911. Price, $3.00.

HANDBOOK OF MENTAL EXAMINATION METHODS. By Shepard Ivory Franz, Ph.D., Scientific Director and Psychologist, Government Hospital for the Insane, Professor of Physiology, George Washington University. With 33 Figures and Diagrams. New York: The Journal of Nervous and Mental Disease Publishing Co. 1912.

A HANDBOOK OF PRACTICAL TREATMENT. By Many Writers. Edited by John H. Musser, M. D., LL.D., Professor of Clinical Medicine in the University of Pennsylvania, Philadelphia; and A. O. J. Kelly, A. M., M. D., Late Assistant Professor of Medicine in the University of Pennsylvania, Philadelphia. Volume III. Philadelphia and London: W. B. Saunders Company. 1912. Price, cloth, $6.00; half morocco, $7.50.

EDITORIAL.

LISTER'S MESSAGE TO THE MEDICAL PROFESSION.

Whenever a really great man dies—one who has not only been an outstanding figure for all generations but a clairvoyant in the best sense of this word—the eulogies for some unexplainable reason run in the same rut: we hear about his public and private virtues, his achievements, his perseverance in the face of adverse criticism, his crowning effort, and finally his delight at the realization that a grateful world did not refrain from hailing him Master. But we never by any chance read in the obituary notices that when a specially gifted man reversed the order of things he did so because his rare insight told him the moment had arrived for him to fight for his principles so that slipshodness, whether in art, literature or science, could no longer be considered a virtue by an easy-going public. Truth to say, every reform movement instigated by a master-mind is a reprimand of the masses or the classes; and, in the case of Lord Lister, his was such a castigation of the surgeon of his day as had never been seen before and will never be seen again. It is impossible for us to realize just what the physical condition of the surgeon of former times was at the momentous moment when he entered the operating-room; but, without stretching our imagination to too great a degree, a glimmer of the truth becomes quite apparent in the light of what we do to-day. That he was one of the great army of the Unwashed is but putting it mildly, for bathing was not only a luxury in those far-off days, but an absolute interference with the tasks bound up in the daily routine of work; but what should not be put mildly is the disagreeable fact that for all the many untoward results which heaped up mountain-high in the operating-room the surgeon of that day either blamed his lack of a comprehension of the disease due to the immaturity of the art of surgery, his faulty technique—this rarely, of course, for

technique was still in its swaddling clothes—or he took a header for that haven of great security for all weaklings—Divine Providence. Dirty finger-nails, hands none too clean, instruments that showed all the insignia of neglect, operating-rooms that were medieval as regards their conduct, were matters of secondary importance until Lister penetrated these befogging mists with his spray and scattered these ignorances to the four winds. Thus the first step of antisepsis was achieved, and though the unwashed surgeon was still unwashed, and his finger-nails were not of a cleanliness that would attract attention, there had been introduced in his *milieu* something to combat his ever-ready acquiescence to introduce microbes into wounds, and then stand aghast at the dire results. Listerism had been born and from the start was hailed with scientific delight, for it was easy to follow, much easier than asepsis, as practised to-day, since it did not involve the onerous task of bathing, but was ready to hand to prevent the former uninterrupted journeys of microbes from surgeons to patients.

It has been said in certain quarters that Lister, though the father of antisepsis, can lay no claim to asepsis as we understand it to-day. This is false reasoning as it cannot be gainsaid that without the first step the last would not have been achieved. Lister's clairvoyance made him aware of the abuses that were prevalent in the operating-room, and to do away with them his remarkable acumen combined with his superior mental faculties told him that the simplest way to squelch them would be to introduce an agent of combat, and not one that would mean the slow progress involved in the education of the surgeon up to the point of extreme personal cleanliness. The times were not ripe for that reform, but they were ripe, or rather over-ripe, for antisepsis, and the bomb that he exploded was strongly antagonistic to microbes, though it may be said that he might have gone a step further and taken the surgeon by the scruff of his neck and parboiled him in hot water. Still what Lister accomplished should not be weakened by the further advances as we see them to-day, since it must not be forgotten that the cult of extreme body cleanliness of our surgeons can be traced without a break to those happy days in the nineteenth century when Listerism unsheathed its sword in its valiant fight against the dirty and unkempt surgeon.

THE NEW WASSERMANN CANCER THERAPY.

When Ehrlich's new principle of chemotherapy was first propounded, one might have imagined that the results would be extended to other diseases than syphilis; and more than one investigator has attempted to apply the principle.

In the cancer field where so much has been expounded and so little proved, where therapeutic endeavors ranging from the *x*-ray and radium to specific cytolysins and other biological phenomena have only raised false hopes, perhaps not as much might be expected as in other fields less obscured by ignorance. The ignorance on the question of malignant tumors is almost appalling; no certainty exists even as to the origin of neoplasms, and various experimental facts are continually being evolved without apparently approaching the fundamental conception. No one hitherto has even been able to show any specific physiological differences in behavior between tumor cells and tissue cells, unless the capacity for unlimited growth can be considered such a difference.

However, not daunted by the haze surrounding the problem, Wassermann and his co-workers, Keyser and M. Wassermann, attempted to apply the principles of chemotherapy to the cure of cancer. Their work was done entirely on mouse tumors and in procedure seems to have followed the method of Ehrlich very closely. The elements they worked with were selenium and tellurium,—two rare elements of the sulphur family, resembling sulphur as closely as iodine and bromide resemble chlorine.

At first they used some sodium salts of these compounds, but exactly what salts were used is not disclosed in their publication. Both selenium and tellurium form acids like sulphurous and sulphuric acid and combine with hydrogen, oxygen and other substances as does sulphur. Therefore, the possibilities of guessing what sodium salts were used are not great. Local injections of these salts directly into the tumor resulted in a softening and melting away of the tumor, but these salts could not be used for systemic injection because of their toxicity.

Realizing that the ultimate success of such chemotherapy depended on a general distribution of a drug which must have a selective action on tumor cells, Wassermann next experimented with other combinations. Interestingly enough he found that the combination of his sodium salts of selenium and tellurium with eosin could be used intravenously without danger to the host and with a specific destruction of the tumor mass. Wassermann found that, if he gave daily injections of his chemicals for eleven days, there was a gradual softening of the tumor mass until it finally disappeared without returning. If during the treatment the injections were discontinued and the softening process stopped, and the tumor began to grow, this being considered evidence of the specificity of the reaction.

The use of the compounds is attended by some dangers. The softening tumor may rupture and become infected, which, in the case of

the small animals, meant death. Also death occurred from toxemia due to absorption of the cleavage products of the destroyed tumor. It would seem, on the other hand, that by further experimentation these technical difficulties could be overcome and the present dangers eliminated.

Beyond the fact that there is a specific attack on and destruction of tumor cells, the exact mode of operation is not clearly defined. Histologically a black precipitate is seen around the nuclei of the tumor cell, and certain other pathological changes, which Hansemann declares are not by any means specific, have been noted. Wassermann is emphatic in warning against a too optimistic outlook for human cancer, and Hansemann even goes as far as to say that the experiments on mice tumors cannot be transferred to the human at all. Hansemann, however, holds a somewhat unique position in his attitude towards mice tumors, and perhaps his view is not optimistic enough. Certainly it is a big step forward to have shown a specific difference in reaction between tumor cells and body cells, and to have found a chemical compound capable of destroying one without harming the other.

REMARKS WORTH READING ON THE SUBJECT OF SALVARSAN.

So much has been written for or against the use of salvarsan that for any every-day mind to remove the grain from the chaff amounts to a Herculean undertaking. And it is the every-day mind in the medical ranks that should enlist our sympathy in this matter, since it is fatuous to say that because of our superior mentality and his inferior equipment no one who is not blessed with our acumen should even dare to follow in our wake. In the republic of medicine there are no elect, that is there is no one who is so highly gifted in the art of therapy that a special pedestal should be his guerdon; and, though our specialists may differ with this opinion, the fact remains that, especially in the case of salvarsan, the mere routine of the proper technique combined with an understanding of the patient's condition is all that is necessary to antedate the administering of the preparation. To prove that this opinion is not a foolhardy one, the reader of these lines is referred to the editorial, "The Present Position of Salvarsan," in the *Lancet* of March 2nd, which has much to commend it for temperateness, excellent judgment, and all absence of the brand of emotionalism that has tinged too many American papers on this subject when the writers jumped at conclusions, either laudatory or denunciatory, after an extensive experience with some half dozen cases!

As the writer of the article in the *Lancet* remarks, "the present posi-

tion of the matter is that salvarsan has been proved to be a powerful
antisyphilitic agent, that in a large proportion of the cases in which it
has been given it has produced no harmful symptoms, but that in a small
number of cases severe symptoms have appeared, and in some cases a
fatal result has followed.   There is evidence to show that in some of these
fatal cases at least the death has been due to the too early repetition of
the dose, and in other cases possibly some error in the mode of adminis-
tration has been committed.   It is clear that the drug has a very definite
value, but it is equally clear that its administration needs the greatest
care"; and the present writer would like to add thereto that in the ma-
jority of the articles that he has perused the innate modesty of the authors
has prevented them from taking to themselves at least part of the blame
attaching to their failures.   In fact, it has invariably been the old story
of the small boy who, in his youthful ardor to master the intricacies of
the game of base-ball, invariably blames the bat for his failure to hit the
ball, and, after his patience is exhausted, throws down the bat in a pet
and in high dudgeon leaves the field, continually looking askance at the
nefarious agent of his defeat.   This attitude of the spoiled child towards
something that he had hoped would bridge over his own deficiencies is
a natural procedure; but, in the case of men who are supposedly of the
thinking order, it is ludicrous to say the least.   And that all the blame
for many a failure in the use of salvarsan has been ignominiously heaped
on the drug may be read quite easily, not in one but in many articles, and
set forth too with an emphasis that cannot be construed other than the
undoubted supremacy of the man who did the administering and the in-
controvertible fact of the danger and uselessness of Ehrlich's discovery.
But as the writer in the *Lancet* would have us to believe, a view such as
this is a very weak and silly one, and, moreover, unbecoming any mem-
ber of the medical profession who is not too prejudiced to keep abreast
of the times in the matter of new and powerful therapeutic agents.

OPINION AND CRITICISM.

DR. WILEY AND HIS CRITICS.

The resignation of the Chief Chemist of the Department of Agriculture has been attended, as all resignations are, by innumerable pleasant and unpleasant criticisms, the former be it said here being limited to all those newspapers and journals that see, in what they glibly call autocracy, a menace to that peculiar interpretation of freedom which cannot be tampered with, even to a slight degree, if we would continue as real Americans with swelling breasts and much grandiloquent talk. But it is an altogether different matter when we read the unpleasant criticisms; for not only do they express regret at the truly unfortunate occurrence, but between the lines may be read the right spirit of progress with which the writers are imbued and the fearlessness of the foolishly-conceived autocracy with which all men in this country are encompassed by those who would have us believe that to get above the niveau of commonplaceness is declarative of war against the best American principles. That Dr. Wiley became more and more assertive of the principles of the Pure Food Law, as time went on, cannot be denied; but this was not because he was arbitrarily autocratic, but because to make his voice heard above the roar of petty and insignificant criticism—petty and insignificant because the motives were sordid—he was compelled to become quite raucous at times in the hope that, by piercing his uncongenial environment, "the common people" might know that he had their interests at heart. And that they know it is evident on all sides; and what they further know is that though we do a deal of rampant talking in our various clubs for their uplift and well-being, our shoutings have the futility of all so-called Utopian ideas when the moneyed interests of certain powers in our commonweath are jeopardized.

All resignations which involve officials with ideals are quite intolerable; for the instances in which the man places his office above his individuality are rare indeed. In Dr. Wiley's case no charge of aggrandizement to make himself a hero in the eyes of the people can be brought, since the course he pursued was not blatantly studded with the objectionable "I." But having assumed the responsibilities of office, he carried these out to the best intents and purposes; and though the lukewarm advocate of reform may say that it is better to curry the favor of those whose practical needs should be respected and not to drift towards the phase of idealism which is not only unnatural but abhorrent in the opinion of all practical people, he cannot say that some idealism is unnecessary to the

widening of one's sphere of action. To compel an official to lumber on from year to year so as to curb his ambition is very foolish reasoning, especially when this ambition spells enlightenment in the matter of the health of the people at large. Better indeed is the dictum laid down by Arthur Christopher Benson in his essay on Frederic Myers, where he says "after all a man must choose his own method and follow his own ideals. A man may serve his generation by abjuring the easy give-and-take of life, and absorbing himself in an investigation the results of which may be fruitful in happiness for others."

LITERARY NOTES.

Despite Henri Bergson's plea in "Creative Evolution" to the effect that biology has failed satisfactorily to explain the various steps in evolution, the late Christian A. Herter's book on "Biological Aspects of Human Problems" (The Macmillan Company, New York) is convincing enough to make us think very well of a branch of science that can be the means of elucidating some of the problems which have been no easy matter to understand. The book from beginning to end holds the reader's attention, though it must be admitted that some of the chapters outdistance others from the standpoint of interest. Without belittling such subjects as The Mechanistic Conception, Growth and Reproduction, Consciousness and the Will, the chapters on Death and Immortality, The Male and Female Mind, Education and the Future of the Race made their strongest appeal to this reviewer, since it appeared to him that the subjects were just the ones upon which Herter wished to express the graces of his mind so that his convictions would sink deeper into the reader's consciousness. What has not been written on death and immortality by purely literary men, by philosophers, and by those who, having steeped their minds in the supernatural, have thought it their mission to inculcate, in others, ideas which when examined scientifically are the veriest froth! And granting that what has just been written is true, is it not a relief to turn to such sane words, as when Herter says: "For I am disposed to believe that this teaching, which cuts off the prospects of heavenly rewards and hellish punishments, would lead to a greater considerateness in all human relations by forcing people to understand the natural, instead of pursuing the supernatural. For example, it is a notorious fact that parents neglect their children in a great variety of ways at the same time that they are greatly pained at the thought that death may permanently separate them from their children. Would not the practical results be better if, being taught to feel that a permanent separation is natural and inevitable, they should drop sentiment founded on a dubious belief, and seriously give themselves to the

task of helping their offspring, with the utmost earnestness and, if necessary, with self-sacrificial efforts?"

Surely all physicians, who have been engaged in the arduous task of preventable diseases, know how ignorant most of us are as regards natural laws, but how grandiloquent, how noisily talkative we are when supernatural matters are under consideration.

———

Of the reference books which have lately come to our desk, "Who's Who in Science" (The Macmillan Company, New York, 1912) easily carries off the palm for the sort of editorship not often found in works of this nature. While this book is an English publication, it is really wider in scope than one would at first imagine, since it is inclusive of the outstanding names in all countries and shows a catholicity, on the part of the editor, which disarms at once any criticism to the effect that an English work of this sort must necessarily be so insular that it is of small worth to those who do not happen to live in the British Isles. No department of science has been neglected, and each name receives its share of attention in the matter of date and place of birth, university or college from which the individual was graduated, positions which are or have been held, the titles of books and articles which the student might wish to know when in quest of knowledge; in short, just the sort of biography that is not only a boon to the person preparing a paper, but to the editor who is often distracted by misspelled proper names. Mr. Henry Holder Stephenson, the editor, should be congratulated on possessing the degree of efficiency that turns its back on carelessness and a slipshod manner of collecting facts.

———

A difficult task indeed is that of the reviewer who wishes to be just in his criticism of Dr. Herbert H. Tidswell's "The Tobacco Habit" (J. and A. Churchill, London), for written across all the pages, in no mistakable way, is the expression of a mind deep-dyed in prejudices.

If it were possible for the reviewer to brush aside the author's bias from the pages of this book—and the effort, we may say here, would require herculean strength—we doubt not that much that they contain could be read in a profitable manner; for, when earnestness is the key-note of a work, considerable thought must have been given to the subject before it was brought forth to the light of day. That the tobacco habit is not the best habit to pursue is part of every physician's store of knowledge, but that it causes all the disastrous inroads into health, so melodramatically pictured by Dr. Tidswell, is leaving the sane path of medical science and wandering aimlessly in those unproductive fields in which the Marie Corellis of so-called literature delight to browse. Phy-

sicians nowadays are biased enough, what with food fads, specialism, and the individualistic note in the manner of doing things medical, to ask them to take unto themselves further prejudices; hence it is the hope of the writer of these lines that Dr. Tidswell's dictum that sterility in the female is generally caused by the tobacco habit in the male will not be put at once into their armamentarium of preconceptions before a thorough threshing of the subject is invoked.

———

In "Medical Revolution" by Sidney W. Macilwaine, M. R. C. S., L. R. C. P. (P. S. King and Son, London) the reader will find the outspoken criticism of a keen observer. And by reason of this he will be brought into close quarters with many things which have now and then been lightly thought of by him, but rarely cogitated over in a way to bear fruit. That there are abuses in the practice of medicine only the thin-skinned refuse to admit; and, this being so, have the others of thicker skin and firmer minds no justification for desiring a complete exposé of all the medical questions of the day, irrespective of whose feelings might be hurt or what that bugbear of all sensitive souls professional— the laity—might think of so undignified a performance? Now, as an advocate of the worth of candor, excellent judgment, and the right to express radical views, the author of "Medical Revolution" is quite in the forefront of the class of critics whose aim, we take it, is a high one, since supineness among their fellow-men is hateful to them, and means just so many sluggish minds that need a deal of stirring up if progress is to be effected. In regard to the medical profession, the dignity, which has been so carefully cultivated throughout years too many to count, has often been a cloak behind which many of our weaknesses have been sheltered; and to so great an extent has this matter of dignity been carried that the mere mention of what should be done in the medical ranks, so as to place the science of medicine on a basis that would be nigh impregnable, has been met with frowns if not with withering censure. Hence a free-lance, such as Dr. Macilwaine, whose every word is thoughtful, whose survey is not limited by prejudices, whose outlook as to the future is not pessimistic—he is never without the leaven which bespeaks a philosophical mind—should not be lightly passed over, but be made, if not a cult, at least the sort of leader to whose book we may resort when too much inactivity oppresses our minds.

———

It is a relief to turn, from the "skimpy" books which generally come to the reviewer's desk in the guise of guides to medical Europe, to "Handbook to Medical Europe" by James Henry Honan, M. D. (P. Blakiston's Son and Co., Philadelphia), because here we have a work

which was not dashed off in an idle moment, but was written with care after sojourns in the various capitals of Europe. Gatherers of data for this sort of book are too often careless as to the sources from which they draw their knowledge; and the result is that, instead of an illuminating book, one is submitted to the public that has all the earmarks of hurry and unreliable bits of information. No such charge can be brought against the work under consideration, as the author was not only painstaking but, what is better, was on the ground for some time before he wrote his chapters. And the outcome of this direct observation is something worth reading: something that does not limit itself to a mere recital of the names of the hospitals and the professors who officiate there, but brings to the reader's notice a complete medical survey of the city discussed—its hygienic, charitable, scholastic and hospital aspects. Students who are contemplating a trip abroad should not neglect reading this very interesting and instructive volume before sailing, for to have one's knowledge reinforced in so pleasant a manner is an asset that cannot be too highly praised.

ORIGINAL ARTICLES.

DIAPHRAGMATIC HERNIA DIAGNOSED BEFORE OPERATION.*

By Norman B. Carson, M. D., and Leo Huelsmann, M. D., of St. Louis.

Since Liechtenstern's article in 1874, in which he reported 250 collected cases of traumatic diaphragmatic hernia, there has been an abundance of literature on this subject; hence, it seems that we are hardly justified in bringing again this condition forward. But as there has been very little offered in the way of operative relief for this condition, we may be pardoned if we take this occasion to discuss again this always interesting subject.

Although herniæ of the diaphragm are met with occasionally at postmortem and operation, they have been rarely diagnosed or even suspected during life. In all of Liechtenstern's 250 cases the condition was recognized but five times.

In the case we have to offer, this condition was overlooked at first, and was only recognized after persistence of symptoms in spite of remedial agents employed.

J. B. H., æt. fifty-eight, born in the United States, married, a farmer and lead miner by occupation, entered the service of Dr. Elsworth Smith at the St. Louis Mullanphy Hospital, August 27th, 1911.

Habits.—Alcohol moderately, smokes and chews tobacco excessively. Appetite poor. Bowels constipated.

Family History.—Good.

Previous History.—Has had measles, pertussis, and smallpox. No typhoid fever; no rheumatism. Denies venereal disease. Gives no history of secondaries.

Present Trouble.—Commenced January 11th, 1911, while working in a lead mine, running a drift, which necessitated a sitting position; roof caved in covering him with about three feet of clay. He was bent forward, doubled up so to speak, his head and chest onto abdomen and legs. Remained in this position for about three minutes when he was able to right himself; was later dug out. At this time he suffered severely with pain in abdomen and lower thoracic zone. He had great difficulty in

breathing from 2 p. m., time of accident, until twelve that night. Confined to his bed for about a month, after which was about on crutches. Since this time on arising in the morning suffers with severe cramping pains in epigastrium and left hypochondrium, lasting from two to three hours. Has pain in epigastrium immediately after taking food, lasting about an hour, uninfluenced by quality or quantity of food. No nausea, no vomiting, no belching; rather a fullness, and a desire but inability to belch. Appetite poor, lost 33 lb. in weight since accident.

Has had stomach trouble more or less for last twenty-five years. Attacks of excruciating pain in epigastrium radiating to right shoulder and lasting about half an hour, coming on at intervals of perhaps two years. No chills, fever, sweats, or vomiting. No jaundice, no clay-colored stools.

Physical Examination.—Poorly nourished, sallow, sclera not icteric, mucous membranes fairly good color. Tongue moist, slightly coated; lips red.

Examination will be detailed, both in sitting and lying positions. Chest fairly well developed; left chest more prominent than right. Breathing costal in type, somewhat accelerated. Left chest moves less with respiration than right. Apex beat neither visible nor palpable. Tactile fremitus diminished on left side below level of second rib anteriorly, and posteriorly below spine of scapula. Fremitus absent entirely below level of sixth rib in anterior axillary line. Hyperresonant percussion note on left side below second rib anteriorly, and posteriorly below spine of scapula. Dullness below level of sixth rib in anterior axillary line. Normal tympanitic note of Traube's space obscured. Heart dullness extends one and a half inches to right of sternum and one inch to left of sternum. Respiratory murmur and voice-sound much diminished below spine of scapula posteriorly. Respiratory murmur absent and voice-sounds diminished below level of second rib anteriorly, and entirely absent about chest at level of sixth rib in anterior axillary line.

These signs change quite remarkably with patient in recumbent position. The hyperresonance, which has been noted anteriorly, becomes a marked tympany. Breath- and voice-sounds are entirely absent. Dullness noted over lower chest is replaced by tympanitic note.

On auscultation we have absence of breath-sounds over left chest below second rib. Marked gurgling or borborygmi can be heard over left chest. At times can be felt a peculiar friction not unlike crepitation. The gurgling sounds are best heard about five minutes after patient lies down, and disappear after patient has been reclining for some time. Coin sound obtainable at times, but not always in same place. No succussion splash can be heard.

Abdomen.—Mass size of an egg felt in lower right quadrant about three finger-breadths below umbilicus, which can be pulled over to appendix region; is soft and suggests muscular tissue.

Ewald test-meal given, withdrawn in an hour; 150 c.cm. of contents without odor removed. No mucus. Total acidity, 62. Free HCl. 44. Numerous yeast cells and sarcinæ. No Boas-Oppler bacilli. No occult blood.

On inflation, the lesser curvature of stomach was two finger-breadths above umbilicus, greater curvature four finger-breadths below umbilicus. Mass less easily palpable after stomach inflation.

Feces show no occult blood after repeated examination. Urine negative.

Transverse colon in chest

Descending colon

Ascending colon

Sigmoid
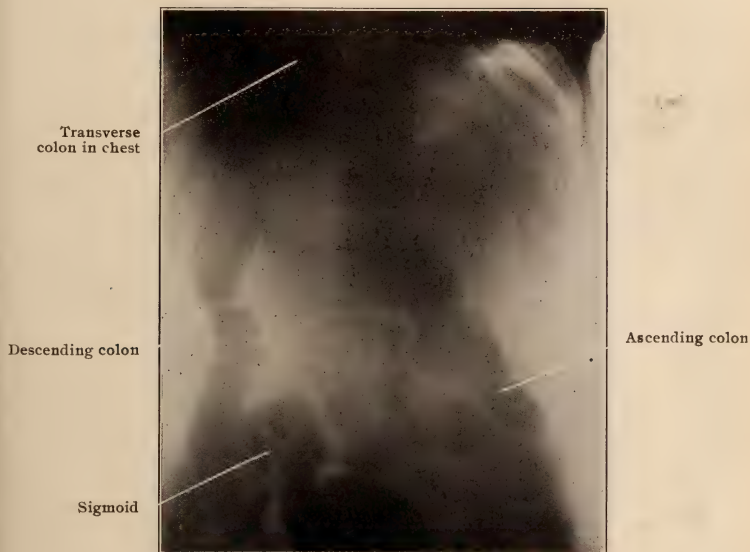
No. 1.—Photograph of abdomen after enema of bismuth was given.

Blood.—Red, 2,952,000; white 8,400; hemoglobin 75 per cent.

Laparotomy by Dr. Clopton September 8th. Mass in lower right quadrant proved to be gall-bladder full of stones, stomach low. Stones removed, gall-bladder drained. Patient's condition did not permit further exploration. Ten days after operation symptoms of intestinal obstruction developed. September 19th, operation by Dr. Clopton through old incision. Gut found adhering to gall-bladder and bowel kinked. This was remedied; and, again on account of precarious condition of patient, further exploration had to be abandoned.

After second operation, he made a slow and tedious recovery. Pains after eating have disappeared, but cramping pains on arising in morning lasting two to three hours still persist. Still obstinately constipated. If patient lies in bed with head high, the pains on arising not so severe.

Patient examined with fluoroscope by Dr. Carman, and view obtained seemed to show a hydropneumothorax. Bismuth given by mouth and stomach was seen to be in abdomen. Bismuth given by enema and colon shown to be in abdomen and partly in left chest. Photograph taken by Dr. Garstang, four hours after administration of bismuth-gruel with
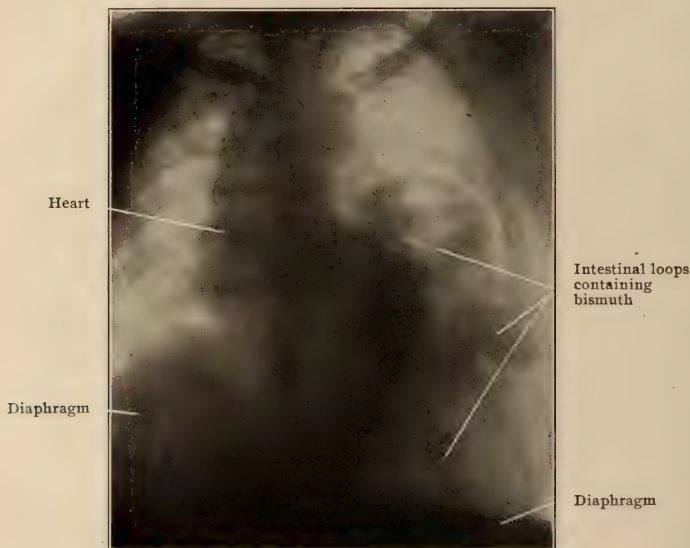
No. 2.—Photograph of patient after ingestion of bismuth (recumbent position).

patient kept in a reclining position, bismuth was found in chest. (See x-ray pictures Nos. 1, 2, 3.)

Diaphragmatic herniæ are divided into two classes, congenital and acquired. Those are also termed true herniæ in which the contents of the hernia are found in a sac, formed either by peritoneum or pleura; and false herniæ in which the sac is absent. Dennis,[1] in 1906, stated that all congenital and 90 per cent. acquired are false herniæ. In Grosser's[2] report, however, of 433 collected cases published in 1899, 40 were true

herniæ, 385 false herniæ. Thirty of the 40 true herniæ were congenital; 244 of the 433 collected cases were congenital, 181 acquired, and 8 unclassified. 261 out of 284 cases collected by Arnheim and as reported by Chadbourne[3] were on the left side. The explanation of the frequent involvement of left side is not hard to find; the large size of the liver, its position on the right side closing very efficiently any defect in the diaphragm, and thus preventing prolapse of the abdominal contents into chest. Knaggs,[4] however, reports one case in which hernia was composed

Heart pushed to right

Coils of intestine distended with gas

Intestine containing fluid contents

Diaphragm
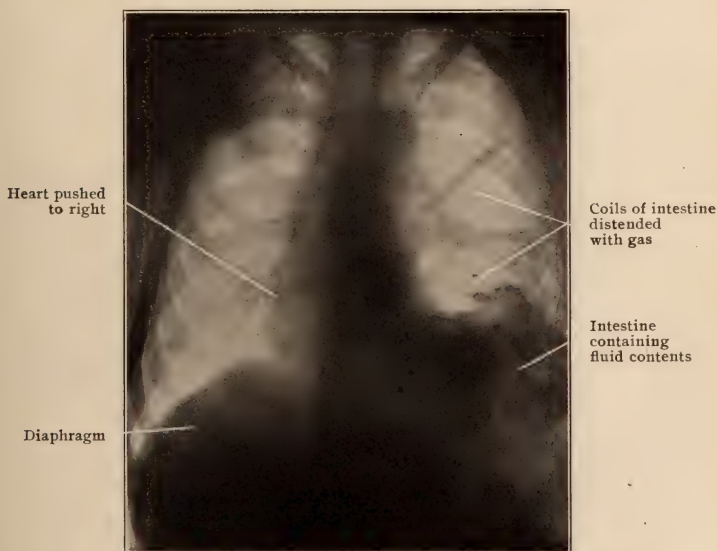
No. 3.—Photograph taken before the ingestion of bismuth. (Patient in sitting position.)

solely of part of liver substance which had forced its way into right side of chest.

Almost every abdominal organ, except the rectum and pelvic contents, has been found in the hernia. In Lacher's[5] 276 cases, stomach was found in 161, colon in 145, omentum in 96, small intestine in 83, liver in 45, duodenum in 35, pancreas in 27, cecum in 20, and kidney twice.

Congenital herniæ, according to Bell,[6] are due to defects of diaphragm. Some defects are due to incomplete union between ventral and dorsal

anlage of diaphragm, and the size is from 2 cm. to complete absence of diaphragm.

Keith[7] holds that all diaphragmatic herniæ take place either through some developmental defect of diaphragm or through the unclosed pleuro-peritoneal passages; in his series there are 5 of the former and 21 of the latter.

All acquired herniæ are traumatic. All herniæ in the new-born, with no record of injury, may be regarded as congenital. The acquired can be diagnosed as such only by previous history; and without a history of

Lung inflated

Heart back in proper position

7th, 8th, and 9th ribs removed

Diaphragm

Diaphragm

Liver
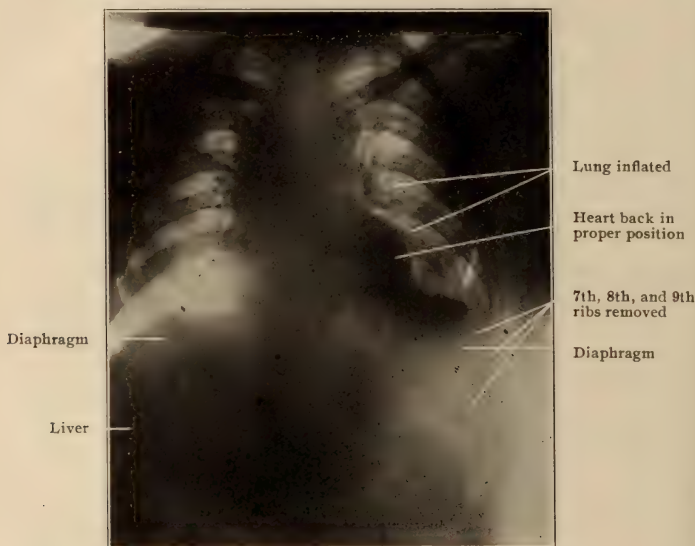
No. 4.—Photograph showing result.   Anteroposterior view.

injury it is impossible to classify. In the congenital herniæ, the edges of rent in diaphragm are as a rule much smoother than in the traumatic variety.

A very frequent form of injury giving rise to hernia of the diaphragm is crushing injury such as is obtained between railroad buffers. Gunshot and stab wounds involving diaphragm often give rise to this form of hernia.

Some one has remarked that diaphragmatic hernia is the easiest form of internal hernia to diagnose, and when we consider symptoms and signs

carefully, always keeping in mind the possibility of such a condition, diagnosis is fairly easy.

We think it well to dwell upon a few points in the diagnosis. The history of injury and, in our case, the regularity of pain occurring upon arising in the morning uninfluenced by eating, disappearing after patient had been up and about for a time, should be noted. This important symptom will explain itself. While lying down contents of abdomen would gradually find its way into chest. On arising in the morning pain would be caused by bowel trying to return at once to abdomen, but

Heart to left

Ends of
resected ribs

Diaphragm

Diaphragm

Liver
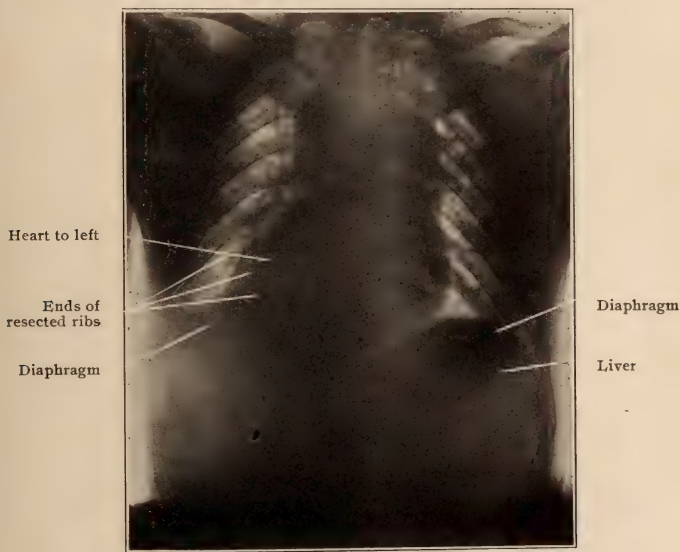
No. 5.—Photograph after bismuth-meal showing result. Posterior anterior view.

unable to do so, due to the fact that the distended contents could not be forced quickly through so small an opening.

The most important physical signs might well be emphasized. Prominence of affected side of chest and diminished respiratory excursion on that side. Displacement of heart, especially marked, if hernia is on left side. Drawing in of abdomen especially in upper portion, and well marked in our case. Intestinal noises in chest. This can be considered the most important of any single sign. Absence of breath-sounds and changes in the percussion note. We might add of great diagnostic value

is the changeable character of signs on change of position of patient. This changeable character can also be noticed while patient remains in the same position.

Diaphragmatic hernia must be differentiated from hydropneumothorax and from gas-containing subphrenic abscess. In the former, the succussion splash, absence of breath- and voice-sounds or amphoric breathing, and the greater constancy of the physical signs, will serve to differentiate. In the latter, the bulging of the upper abdominal zone instead of the drawing in, tenderness and the septic course, make diagnosis comparatively easy. The assistance of the x-ray is almost invaluable to confirm the diagnosis.

Fig. 1.—Line of incision.

TREATMENT BY DR. CARSON.

Last September, on resumption of service in the ward of the St. Louis Mullanphy Hospital, I found a patient recovering from two operations on the gall-bladder, which had been performed by my predecessor. The first operation was for the removal of gall-stones, and the second for the relief of symptoms of obstruction. The gall-bladder had been reopened during the last operation, for the reason that it was distended with dark bile, and when I first saw the patient, it was still discharging. The symptoms, as described, were present, with the additional one of pain in the shoulder along the upper border of the trapezius muscle, a symptom that seems to me to be almost pathognomonic of diaphragmatic hernia, as I find it mentioned as being present in a great many recorded cases.

When I took charge of the patient, his condition was not good, as he had not yet recovered from the last operation which had been done but a

short time before. He remained in my service for several weeks, and while his general condition improved, his symptoms remained; and he was returned to the medical service without a correct diagnosis having been made. Later he was returned to the surgical service for operation, with a diagnosis of diaphragmatic hernia, for which an operation was done December 13th, 1911.

Ether was given by the drop-method until the patient was thoroughly under its influence, when a rubber-tube was introduced into the trachea, through a Cotton catheter, and the ether anesthesia continued by the in-
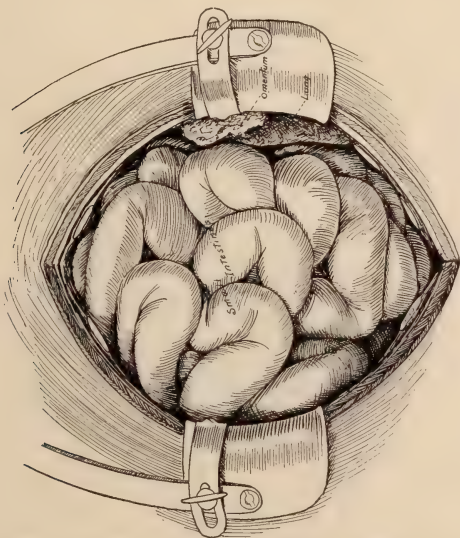
Fig. 2.—Showing small intestine filling thoracic cavity.

tratracheal insufflation method, with a Quimby apparatus. Through the entire operation the lung retained its natural color, and only two or three times during the operation did it interfere with the work, and then only for a short time, while the pressure was temporarily raised; and had it not been for the artificial breathing kept up by this method, I am sure that the patient would have died on the table, for as soon as we began to handle the intestines in our efforts to restore them to the abdomen, the blood-pressure suddenly fell, and his condition became alarming. The operation, however, had to be continued; we had to depend on stimulants and the artificial breathing to sustain our patient; both were continued until the

intestines were returned to the abdomen and their manipulation had
ceased, when his condition improved, and the operation was finished. We
are also indebted to the insufflation method for the absence of many diffi-
culties that we would otherwise have encountered, the principal one being
the movements of the diaphragm, which were absent during the entire
operation.

In order to reach the hernia, an incision was made in the eighth inter-
costal space on the left side, from the sternum to the erector spinæ down
to the pleura, which was opened throughout the entire extent of the skin
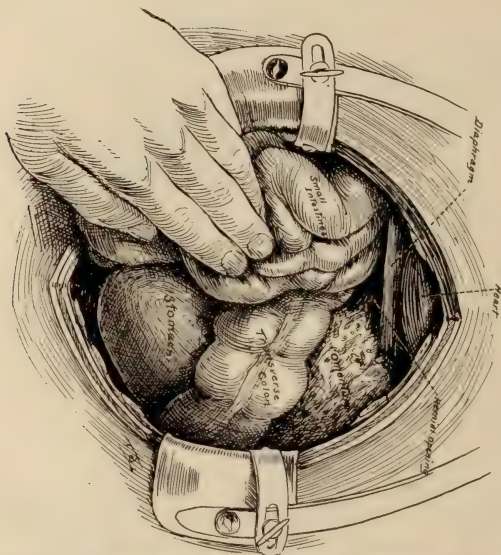
Fig. 3.—Showing small intestines with transverse colon crossing stomach and
omentum as they came through opening in diaphragm.

incision (Fig. 1). Before making the pleural opening, pressure in the lung
was raised to 25 mm. of mercury. The rib stretcher was then introduced;
but, on account of rigidity of the ribs, enough space could not be secured,
and it had to be removed, and the eighth, ninth, and later the seventh
ribs were resected. Upon opening the pleura, the chest was seen to be
full of small intestines, except at the upper border, where a small edge
of the lower lobe of the lung and a small fringe of omentum were visible,
as shown in Fig. 2. When the small intestines were pushed down, a

large opening in the diaphragm was found, and was seen to extend backwards, from about an inch from the costal cartilage in front, to the posterior limit of the diaphragm behind, and about a half or three quarters of an inch outside the pericardium and the esophagus. Through this opening came into the pleural cavity all of the stomach, transverse colon, the omentum, parts of the ascending and descending colon, and about 15 ft. of the small intestine. Fig. 3 shows the small intestines drawn down, the stomach inverted, with the colon crossing, as they all come through the hernial opening together.
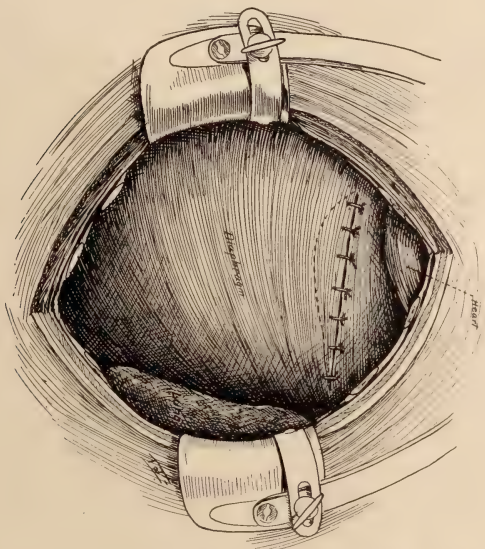
Fig. 4.—Dotted line shows shape of opening in diaphragm. Solid line shows opening closed, with sutures in place.

After several attempts to return the mass to the abdomen, an opening below the costal border was made by Dr. Clopton; and after much effort, we were finally successful in reducing the hernia, and closing the opening with several silk sutures. It was impossible to do an overlapping operation, on account of the narrow border outside the pericardium. After closing the hernial opening, that in the chest-wall was closed in layers, but before closing, the pressure was raised and the lung fully expanded.

The hernia was evidently congenital, although the history might lead

us to think otherwise, as the pleural and peritoneal surfaces were continuous, and the edges of the opening were sharp, smooth and regular, and the hernia itself without a sac. Another point in favor of its congenital origin was the long-continued stomach trouble and the gall-stones; due no doubt to the constriction of the common-duct and inversion of the stomach while in the pleural cavity. The dotted line in Fig. 4 shows the shape of the hernial opening, while the solid line shows the opening closed, with sutures in place.

The pleural route is unquestionably the route that should be chosen, as it affords the most direct access to the hernia; and if the hernia is small, it can be easily reduced and the opening closed, but this cannot be done from below, if the opening is high up on the arch of the diaphragm. If the opening is large, the combined pleural and abdominal operation should be done without delay, as it would be impossible to return the hernia without the two openings. The pleural route also enables the operator to judge of the condition of the protruding bowel, in a case of small constricting hernia. The bowel may be easily torn in attempts at reduction, especially if there is constriction and the bowel has been out for some time, and if an attempt is made to reduce it from the abdomen. This condition is likely to be present, since we learn from the literature on the subject that many of these cases die unrecognized from strangulation.

We found it impossible to carry out the technique of Carrel in this case, although we tried to do so; because, in the first place, the silk napkins interfered with the return of the intestines, and, in the second place, it would have been next to impossible to have prevented the loss of the napkins.

In attempting to protect the lung during the operation, we used china silk napkins, boiled in vaseline, but had to abandon them for the aforementioned reasons. We found, however, one great benefit from our attempt to use them; and that was, the lung and surrounding parts becoming covered with vaseline, the exsiccation of the lung was prevented, a condition that we had to deal with in work upon dogs when vaseline was not used.

The anesthesia was perfect, and the patient recovered quickly from its effects, with less vomiting and other disturbances than after his previous operations. There was nothing worthy of note in the after-treatment of this case, as it differed in no way from the usual treatment after severe operations. The skin wound, however, opened throughout its entire length on the ninth day, while the deeper layers held. The lung remained inflated, filling over three-fourths of the cavity, and the heart gradually came over to the left side; and now (February 4th, 1912) nearly occupies its normal position. The patient says that all the distressing symptoms, that were present before the operation, have disappeared, and the only discomfort that he suffers now is a "bloating" that comes on some time

after he has eaten a meal.   X-ray pictures taken February 7th show a perfect result.   (See Nos. 4 and 5.)

BIBLIOGRAPHY.

1 Dennis (*Journ. Minn. Med. Assoc. and Northwestern Lancet*, Vol. XXVI, No. 3, p. 111, 1906).
2 Grosser (*Wiener klin. Wochenschr.*, p. 655, 1899).
3 Chadbourne (*Amer. Journ. Med. Sciences*, Vol. 126, 1903).
4 Knaggs (*Lancet*, Vol. II, p. 358, 1904).
5 Lacher (*Deutsch. Archiv fuer klin. Med.*, XXVII, 1880).
6 Bell (*Amer. Journ. Med. Sciences*, 137, p. 581, 1909).
7 Keith (*Brit. Med. Journ.*, Vol. II, p. 1297, 1910).

RAYNAUD'S DISEASE.

By Eric Carl Beck, M. D., of New York,
Attending Surgeon to St. Mark's Hospital of New York, Chief Surgeon to
German Poliklinik of New York; etc.

There is no question in the minds of the profession to-day that Raynaud's disease is of far greater occurrence than was at first supposed. We have now come to a point where we are more liable to make a

positive diagnosis in the earliest days of this condition and point out its severity to the patient afflicted. There is no vestige of a doubt that the direct, the most active factor is the obliterating arteritis which begins in the vessels of smallest calibre, usually those of the toes and, less frequently, those of the fingers. In at least 40 cases seen by the writer in his clinics, the toes were always affected, and he cannot recollect a single case in which the fingers were involved. Usually the second and third toes were those in the most precarious condition. He looks upon every

case in which the patient complains of sharp pains, coldness of the toes, and where they are pinkish in color with a dry shiny skin, as a probable case of Raynaud's disease. If there is gangrene a local amputation of the affected member may be all that is necessary, but healing of the wound-surfaces is exceedingly tedious and long drawn out. The writer calls to mind one case, in which he amputated the third toe with its metatarsal in order to bring the resultant flaps into perfect approximation, in which healing did not take place until two years after operation.

Some cases have shown traces of sugar in the urine, but the writer does not consider this a diagnostic point. The appearance of the skin and the patient's subjective symptoms ought to be decisive.

For local application, the writer has found that the liquid ichthyol in 10 per cent. strength gives most relief. Internally large doses of potassium iodide are very beneficial; and, if the patient can rest in bed and make hot applications of some antiseptic solution to his feet, he is doing all that is possible. The writer would say that about 20 per cent. of the cases can be kept comfortable under these measures. At least the progress of the disease can be arrested.

Some authors have claimed that Raynaud's disease is found always in young neurotic subjects, between puberty and thirty years of age. The earliest case the writer remembers was in a young pedlar of twenty-five,

and the oldest patient was a man over fifty who had been a tailor most of his life. Occupation does not seem to be very much of a causative factor, but the male seems to be almost exclusively affected. The writer has seen only one case in a woman, and that always seemed a doubtful one to him.

The accompanying photographs are of a case in which the writer amputated the large toe for gangrene. While removing the toe, he noticed that bleeding was very scanty, and remarked about the probability of sclerosis in this case. Forty-eight hours later the gangrene had extended as shown in the pictures, following approximately the branches of the dorsalis pedis artery. The patient complained of spasmodic pains radiating throughout his calf, but showed no symptoms of sepsis. The writer advised amputation at the knee, and operated upon him forthwith.

In these cases of endarteritis, or thrombosis, or in senile gangrene, the writer employs the Esmarch constriction-bandage to diagnose the extent of normal circulation, and amputates a little within that area. The line of demarcation is shown in pink and white by the compression of the tissues.

The patient in this case was thirty-five years of age, and made an uneventful recovery. The pathologist's report was obliterating endarteritis.

The question arises, Is Raynaud's disease an affection of the vasomotor nerves causing disease of the arteries, or is it primarily a disease of the inner coats of the arteries with the nervous symptoms secondary to it?

37 East 31st Street.

THE ECONOMICS OF FOOD.

By A. L. Benedict, A. M., M. D., of Buffalo,
Consultant in Digestive Diseases, City and Columbus Hospitals.

No head of a family or housewife, who is at all thrifty, would install a heating plant, buy fuel, clothing or any other staple commodity without some inquiry as to the actual quality and quantity, in the sense of durability and efficiency. Food, which costs 10 per cent. or more of the earning capacity of a single man at fifty dollars a week and which may amount to half of the total cost of living for a man on a salary of a thousand a year, if he has a fair-sized family, almost never receives the attention, economically, which it deserves.

Even in the case of institutions in which the efficiency of fuel, various means of lighting, etc., are carefully calculated in scientific units, the purchase of food rarely receives greater attention than the establishment of a fair minimum per meal, per capita. In the most careful private families, there is almost never any appreciation of the true nutritive value of individual food-stuffs, and the economics of food is reduced only to a monthly allowance; perhaps aided by empiric rules that a pint, pound, quart, bushel or other gross unit of this or that food-stuff has a certain range of price, and that it will be purchased only when a certain figure is reached in the retail market. In choosing among various meats, cereals, vegetables and fruits, quality is limited to such superficial attributes as freshness, freedom from decay and rarity or degree of palatability; and quantity is practically never reduced to terms of ultimate nutritive value if, indeed, an allowance is made for gross waste.

The person of ample means who deliberately pays from 50 to 100 per cent. more for porterhouse than for round of beef, because the former is easier to chew and more aristocratic, even if no better in flavor, is economically wise, compared with the person of limited means who, with the false idea that he is saving money, buys shoulder, neck or some similar cut containing a large percentage of gross waste, at a few cents per pound less than round, heart or other cut containing nearly clear muscle.

The newspapers have recently contained accounts of a swindler who advertised the best quality of silk, full measure, at fifty cents a yard. He found many purchasers by the mail-order method. The silk was of the best quality and full measure, but it was silk thread. But, with no thought of swindling on the part of the salesman and no realization by the purchaser of how little he is getting for his money, almost the whole

trade in foods is being carried on without attention to anything else than price and unit of measure.

Even among chemists, botanists, physicians and sociologists who, from one standpoint or another should have had their attention directed toward the composition of food-stuffs, there is a surprising ignorance of the real value of foods. Granting that an item of expense which for all but the very rich can scarcely be less than 5 per cent. under present conditions, and which may amount to 50 per cent. of the total income, is not important enough to be attacked in one's own menage for the sake of saving money, it ought to be a matter of pride among men, supposedly well educated along scientific lines, to have some conception of food values. An engineer may not choose, for his own house, between different methods of heating, on grounds of financial economy, but he will know the differences in caloric efficiency, and he will know the caloric values of different kinds of fuel.

Passing from the personal to the general view, it is just as important to study the possible economics in food-supply as to consider the cost and hygienic requirements of housing. Indeed, the popular complaint as to the increased cost of living, not counting luxuries, is directed more toward food than toward housing, clothing or any other one item of similar nature. None of these other items can be materially reduced except by philanthropic investments of large capital, by radical changes of tariff legislation, with the consequent disturbance of industries, or by socialistic interference. On the other hand, the cost of food can be greatly reduced simply by education, with no great expenditure of money and with only such commercial disturbance as necessarily attends a refusal to expend money unwisely.

Dietetic economics is not a simple study in the sense that it can be learned in an hour. On the other hand, it need not involve a thorough understanding of the chemical and physiological principles upon which it depends; it requires nothing more than an amount of memorizing insignificant as compared with that of the materia medica, a knowledge of the existence of tables as easily consulted as a dose-book, and the arithmetical knowledge of a child of twelve years.

While the use of water, salts, iron, etc., enters into a full discussion of dietetics, the economics of dietetics is concerned almost solely with proteid, carbohydrate and fat. For the sake of brevity, we may ignore the aspects of the question pertaining to age and size and, as it is obviously impossible to carry out exact quantitative measurements under ordinary conditions, we need consider only the requirements of an average adult under average conditions of exercise.

These requirements may be stated in comparatively simple terms. An allowance of 2,500 calories per day per capita is ample, except for manual laborers. We must give at least 50 grm., better 60 grm., and should not ordinarily give more than 100 grm. of proteid a day. The body cannot

economically nor hygienically digest more than 150 grm. of fat a day, and it is better to hold the fat between 50 and 100 grm., though much less or practically none at all may be used without harm. All proteids are not alike, though we have little practical knowledge of their exact difference. Probably it is a safe rule to give half meat and half other forms of proteid. From the physiological and economical standpoints, fats differ mainly according to their melting point, the softer the fat (or oil) the less waste. For our present purposes, we may consider carbohydrates in two categories, starch (including dextrin) and sugars. At least 100 grm., probably as much as 200 grm. of sugars, including those of fruits, milk-sugar and the commercial sugars in solid form and in syrups, may be given a day. Cellulose is a carbohydrate in the chemical, but not in the physiological sense.

Theoretically, proteids yield 4.9 calories per gram; carbohydrates 4.1; fats 4.9.

With a few exceptions, mainly of a more or less artificial source, raw food-stuffs consist of very varying percentages of all three organic nutrients: proteid, carbohydrate, and fat. Allowing for the inevitable waste in the assimilation of these nutrients, it is not only simpler, but practically more accurate to say that carbohydrates and proteids each yield 4 calories per gram, fats 8 calories. Hence the caloric value of any food-stuff, exclusive of such gross waste as shells, pods, dense animal and vegetable fibre, bone, skin, etc., may be stated in the following formula:—

$$\text{Calories equal } \frac{4 \ (\text{plus c plus 2 f})}{100}$$ in which p, c and f are respectively

the percentages of proteid, carbohydrate, and fat.

Reference has purposely been made to *arithmetical* knowledge, for the reason that while algebra may be employed to a limited degree in dietetics, the various requirements and available sources of nourishment are too loose to enable one to frame equations from which unknown quantities representing proteid, carbohydrate and fat, may be calculated. The cut and dry method is the only one available for the dietetist when he essays quantitative calculations.

Man is the most truly omnivorous animal that exists. Subject to certain local and temporary habits, he eats practically everything that has any nutritive value whatever and which is not poisonous. Many of his ordinary food-stuffs are almost entirely innutritious, though of some use in furnishing a bulky residue to stimulate and afford a foothold for peristaltic action, and in supplying salts, water and vegetable acids. Many, including alcoholics, tea, coffee, chocolate, spices and relishes, are strictly toxic though in a comparatively mild degree. He excludes many useful animal foods from esthetic notions which differ for different races, and consumes various tainted and infected or, at least, infested foods, as delicacies.

It is evident, therefore, that the dietetist must study and memorize, or at least tabulate for reference the composition of a wide variety of raw food-stuffs. And, in cooking, these raw materials are combined and modified much more elaborately than are drugs in preparing Galenicals. Even so, the part of dietetics which corresponds to dosage is simple as compared with the work of the drug therapist, owing to the ease with which food-stuffs may be grouped, to the fact that individual samples may vary in composition more than members of a group, so that average compositions may be trusted to represent a fair estimate for a period of a week or so, and to the fact that, for any locality, comparatively few food-stuffs are, or at least need be, used.

But neither from the physiological nor the economical standpoint, is it possible to make any headway without careful study of tables of the composition of foods, of which the best are summaries or excerpts of those prepared and freely distributed by the United States Department of Agriculture.

Irving Fisher has prepared tables showing the weight of various food-stuffs corresponding to 100 calories. Each of these units represents approximately 1/25 of a day's ration. It is easy to calculate from prices per ounce or pound, the cost of a ration supposing it to consist exclusively, as of course it should not, of any one article. Or, the dietetic value may be computed from the ordinary retail unit, at a certain cost, and compared with the total of 2,500 calories, with due allowance for gross waste.

It is not the purpose of this article to make an exact schedule of the cost of food which, of course, varies greatly according to locality and season, nor to prescribe a diet of minimum cost. As a matter of interest, it may be stated that the United States Navy estimated the cost of its ration, for the recent trip around the world, at a little over twenty-one cents per capita, per diem; but the ration was very liberal, over 50 per cent. in excess of that required for persons not at manual labor, and much of it was cooked and canned. One of the New York State Insane Asylums, without any attempt to reckon calories, has brought its average meal below five cents, for patients, attendants, and medical staff. During the summer, in the country, very liberal though not elaborate camp rations for open-air schools, etc., cost not over a dollar a week a head. In all probability the cost of raw food-stuffs could be reduced to ten cents a day by careful buying in quantity, on a close calculation of calories and proteid.

In computing physiological values from prices, the pound avoirdupois may be counted as 450 grm., the ounce as 28 grm., the pint as 475 c.cm., the quart as 950 c.cm.

One of the most economical foods, from the caloric standpoint, is sugar. At five cents a pound, the day's ration of 2,500 calories would

cost about seven cents, but, of course, only from a sixth to a third of the ration should consist of sugar.

Lard, at ten cents, allowing for the greater physiological waste in digestion, is of almost exactly the same value, cent for cent, but not much over a sixth of the ration should consist of fat. Butter at twenty-five cents a pound represents a ration at the rate of about eighteen cents a day, with the same proviso, but it is a little better utilized by the body. Even at comparatively high prices, butter usually costs less, per unit of caloric, than the average food of a family in comfortable circumstances; but, on the other hand, many persons eat two or three times as much butter as they can assimilate, in addition to fats present in meat, etc.

Contrary to the popular impression, the various cereals, that is to say the seeds of certain grains of the grass family, like wheat, oats, barley, rice, corn, are of about the same food value, running about 10 per cent. of proteid and 75 per cent. of carbohydrate with a fraction of 1 per cent. up to nearly 2 per cent. of fat, when ground into meal or flour and worked, they are quite perfectly digested, yielding about 3.5 calories per gram. One and two-thirds pounds would, therefore, represent a trifle over the day's ration, and, as some of these flours or meals can be bought at about three cents a pound, the daily cost would be only five cents. Excepting for the addition of water and the destruction of some of the carbohydrate by yeast in raising bread, the various bread-stuffs are of approximately the same composition. Crackers may contain 3, 5 or even more than 10 per cent. of fat. Furthermore, foods of this general nature contain proteid in about the requisite amount and fulfil better than almost any other food, not even excepting milk for adults, the requirements of a complete food.

Cereals in the limited sense of breakfast foods are of about the same dietetic value but are much more expensive. Many persons imagine that the large packages of some of these foods sold for ten to fifteen cents, are pounds, whereas they contain only 6, 7, or 8 ounces net weight. Twenty grams of pop corn, fill an ordinary popper and some of the newer breakfast foods are almost equally light and bulky so that it is practically impossible to eat enough to support life.

Fresh vegetables, both on account of the gross waste and the large content of water and cellulose, are by no means as nutritious as they are usually supposed to be. The following contain such low percentages of nutrients and what there is is so thoroughly incased in cellulose that they are of practically no caloric value: Asparagus, cabbage sprouts, cauliflower, celery, cucumbers, beets, greens, lettuce, rhubarb, sauer-kraut, spinach, tomatoes; of slightly greater value, but usually containing less than 5 per cent. of carbohydrate and inappreciable amounts of proteid and fat are cabbage, egg-plant, kohlrabi, leeks, okra, pumpkin, radish. Even potatoes contain 20 per cent. of gross waste (peelings), and the net weight contains scarcely 20 per cent. of carbohydrate and too little

proteid and fat to be utilized. At fifty cents a bushel, they correspond pretty closely in relative value to sugar at six cents a pound. Vegetables consisting of seeds, as peas, beans and corn, are obviously more nutritious, especially in proteid, than leaves, stalks and tubers, etc. Dry peas and beans indeed contain nearly as much carbohydrate as the true cereals and nearly twice as much proteid. But, in the green state, they contain about 50 per cent. of gross waste and the edible portion is about as rich in carbohydrate as the potato (20 per cent.), but also contains from 5 to 7 per cent. of proteid.

Fresh fruits contain practically no nourishment, except sugar; a good rough rule being that any fruit, preserve or dessert of a degree of sweetness, acceptable to the average civilized palate, contains about 20 per cent. of sugar. A large orange or two fair-sized apples represent about 100 calories. Generally speaking, all fresh vegetables and fruits are rather expensive in proportion to their caloric value, especially when we consider their low content of proteid. While too bulky to be used as an exclusive diet, even were there no other reason, we may say that the cheaper fresh vegetables and fruits correspond to a cost of about twenty-five to fifty cents a day.

It has already been stated that milk is not a "complete" food for an adult, since it contains approximately 4 per cent. each of proteid, carbohydrate (lactose), and fat. Each 100 c.cm. represents a caloric value of about 64. Thus, about 3½ quarts would be necessary for a day's ration. Not only is this ration too high in fat, but it is too low in carbohydrate to be physiologically economic, while, at the same time, the amount of milk sugar is apt to overstrain the glycolytic power of the body. The cost of the ration, if available, would be about twenty-one cents at ordinary rates in smaller cities.

A large egg represents almost exactly 100 calories, corresponding to a ration price of from twenty-five to seventy-five cents or even more. An egg of average size contains almost exactly 1/10 the amount either of fat or proteid of a pound of fairly lean meat. In other words, the day's ration of meat is about 2½ lb. There is also a close correspondence economically, eggs at one cent a piece being about as cheap relatively as meat at ten cents a pound, and so on for increasing values. Allowing for the introduction of 25 grm. of meat proteid a day, 125 grm. of meat free from waste would be required. This amount is equivalent to five lamb chops whose weight, including bone, would be about 150 grm. or a third of a pound, if we trusted to the tables of the United States Government, but which is actually about a pound.

It is easy to see that the meat-proteid ration, even if served in cuts comparatively free from gross waste, and of low price, can scarcely be reduced in cost below five cents, and, with the included fat, the net value in calories is not much over 200.

Thus, from the economic standpoint of price and calories, the cheapest

ration consists as largely as possible of sugar, bread-stuffs, and lard or similar fat. The necessary amount of meat and of fresh vegetables and fruit, though representing a minor part of the caloric energy, will bring the total cost up to nearly three times the rate for the former group, or say to fifteen cents a day, under the most thrifty private management and, without any obvious extravagance, may easily double or treble this cost.

THE SURGICAL TREATMENT OF ASCITES.

By J. F. Binnie, M. D., of Kansas City, Mo.

The causes of ascites are numerous. When ascites is only part of a general dropsy no aid from surgery can be anticipated. When the effusion is due to obstruction to the portal circulation in or near the liver (hepatic cirrhosis, tumors, etc.), much may sometimes be accomplished surgically in endeavoring to obtain a *symptomatic* cure. Even when the effusion is not due to *portal* obstruction but to some incurable condition such as carcinoma affecting the mesentery or peritoneum, *theoretically* some alleviation of the distressing symptoms might be hoped for from some of the measures to be discussed. It is without the scope of this paper to consider the treatment of ascites resulting from lesions such as ovarian papillomata on the extirpation of which the ascites disappears. The huge amount of fluid often present in ascites produces very distressing and disabling symptoms, especially respiratory and cardiac, due to interference with the action of the diaphragm.

In the past, removal of the fluid was sought by means of purgation and of tapping or aspiration. This removal of fluid gave very great comfort to the patients, but the comfort was only temporary and purchased at a heavy cost. (Exceptions to this statement will be noted presently.)

The fluid removed (directly by tapping; indirectly by purgation) is lost to the patient, and a rapid reaccumulation is the rule. No one can stand the continued loss of so much fluid. The blood is drained both of water and nutriment. Renal elimination is lessened, etc. etc.

On principle any treatment is bad in which the ascitic fluid is removed from the body and wasted.

Gilbert and Garnier note that after paracentesis changes take place in the blood, characterized by temporary increase in the number of corpuscles due to concentration of the blood by transudation into the peritoneal cavity evacuated by the paracentesis. This has been named "serous anemia." This anemia does not commonly persist longer than three to six days after the operation. Sometimes repeated operations occasion a "chronic serous anemia" accompanied by thinning of the face, pinching of the nose, strained features, dull color and dryness of the skin, etc. etc. This is not always due to the loss of the fluid alone. Some patients show a great tolerance to paracentesis, e. g., Mead drew off 1,920 litres in six and a half years. Lecanu aspirated 886 times in fifteen years. The symptoms of serous anemia may occur after a single

or even after no paracentesis. Perrin* attributes the serous anemia to hepatic insufficiency.

After repeated tapping a symptomatic cure has been obtained in a number of cases. This was, of course, a pure accident. Drummond and Rutherford Morison, and, independently of them, Talma, came to the conclusion that the fortunate and curative accident was the result of adhesions being formed between the viscera and the parietes, and that, as a consequence, anastomoses were established between the portal and the systemic circulations.

Thus some of the blood returning from the viscera could enter the general circulation without passing through the liver, and so portal obstruction was lessened and avoided.

If accidental formation of adhesions is productive of good, why should the surgeon not produce widespread adhesions, in a purposeful fashion, by means of operation in such a manner that the greatest possible vascular anastomosis might be obtained with the least possible danger? Morison and Talma, independently, devised the operation of omentopexy, and the results have been, on the whole, gratifying. The name omentopexy is rather unfortunate because the fixation of the omentum to the parietes is only a part, though the major part, of the operation. This operation may be performed in many ways, but these ways are mere modifications of one and the same procedure. The typical operation consists in (1) opening the abdomen, (2) brushing the surface of the liver with gauze so that it will adhere to the diaphragm and parietes, (3) brushing the spleen with gauze for the same purpose, and (4) uniting as large an amount as possible of the omentum to the parietes. Some French surgeons perform cholecystostomy also, which may be of indirect benefit.

The whole principle of the Morison-Talma operation is to "dodge" hepatic obstruction to the portal circulation.

An editorial in the *American Journal of Surgery* (June, 1909) gives the following statistics based on 1,565 collected cases: 30.4 per cent. cured, 19.8 per cent. relieved, 39.2 per cent. not relieved, 10.6 per cent. died. Rolleston thinks that ascites is due to a toxemia, and that operation reduces the amount of blood passing through the liver and diminishes the toxemic condition of the blood, by enabling that organ to deal more satisfactorily with the quantity of blood which does pass through. Operation further relieves the venous engorgement which permits a better arterial supply, improves nutrition of the liver-cells, and so favors compensatory hyperplasia.

The huge dilatation of the superficial epigastric veins, after successful omentopexy, proves the establishment of a copious collateral circulation. The same is shown from another viewpoint by a case of Brahma-

chari's,* in which enormous dilatation of the veins of the abdominal wall accompanied hepatic cirrhosis without ascites.

The experiments of Eck, in making a fistula between the hepatic vein and the inferior vena cava, led a number of surgeons to attempt forming a direct anastomosis between the portal and the systemic circulations. Tansini proposed and Vidal carried out this operation on man; the patient died in four months with evident signs of general infection. Another patient, operated on by Thierry de Martel, died after forty-eight hours from anuria. A mesenteric vein has been anastomosed to the ovarian, but unsuccessfully owing to thrombosis.

All these methods of direct anastomosis between the portal and general circulations are theoretically improper. As Guibé writes, "this operation ought to be abondoned, because, however efficient it may be, it exposes the patient to two great dangers, the danger of alimentary intoxication which might possibly be foreseen and avoided, but especially the danger of a general infection of intestinal origin, since the intestinal mucosa does not always oppose a sufficient barrier to microbic invasion." In the Morison-Talma operation there is only a moderate amount of the portal blood deflected from the liver, not enough to expose the patient to great danger of intoxication from intestinal drainage, but sufficient in combination with other factors to lessen or do away with the ascites. The operation aims to prevent portal stasis and, hence, to diminish or prevent excessive excretion into the peritoneal cavity.

The theoretical objections to direct anastomoses between the portal and general circulations may be more apparent than real. Schulz and Mueller report a case of thrombosis of the portal vein, near the liver, causing complete obstruction and ascites. Paracentesis was necessary every two weeks for a year. "The nutritional condition was perfectly normal, as shown by the weight. Superficial compensatory circulation was fully established. At autopsy no anastomosing vessels were found between the portal system and the liver."**

Bernheim and Voegtlin, as the result of many experiments made on dogs, conclude that "Eck fistula dogs, if kept on a proper diet, may live without being influenced by the operation for a long time," and further that "proof is furnished for the assumption that the application of the operation to the human being is perfectly compatible with life."

The great objection to the removal of the ascitic fluid by paracentesis or by purgation is the absolute loss of that fluid inseparable from the treatment. Is there any means by which the fluid may be removed from the peritoneum and yet preserved to the patient? Obviously it would be possible to withdraw the fluid and immediately inject it into the subcutaneous tissues as is done with salt solution in hypodermoclysis—as obviously this treatment is utterly impracticable. Slow drainage of the

---

Lancet, December 14th, 1907.
**Bernheim and Voegtlin, *Bulletin of Johns Hopkins Hospital*, February, 1912.

fluid into the tissues has been attempted in several ways. Acting on a suggestion made by Wynter, Handley has opened the peritoneum through the femoral canal and sutured the edges of the peritoneal wound to the surrounding tissues so as to prevent its closure, the skin wound, of course, being completely closed. Handley's object was to conduct the ascitic fluid into the subcutaneous tissues of the thigh whence it might be absorbed. In at least one case there was a brilliant result, but the femoral canal usually became plugged, and failure resulted. Handley has done excellent work in the treatment of that brawny swelling of the arm which follows excision of the breast in some rather rare instances. By implanting long silk threads in the subcutaneous tissue from the wrist to the scapular region, he endeavors successfully to form new lymphatic routes for the drainage of the arm; and so does away with the exceedingly painful and distressing swelling of the arm. The operation has been named lymphangioplasty. Using the same principles, Handley opened the abdomen in the left semilunar line, and passed a stout needle, threaded with lymphangioplasty silk, in and out in a series of loops through the peritoneal and subperitoneal tissues of the right iliac fossa external to the mesocolon.

Short loops of the silk were left exposed within the peritoneal cavity whence they could suck up fluid by capillary attraction. The process was repeated with two other threads. The four threads were conducted to a point near the anterior superior spine, and then with a long probe were pushed over the outer part of Poupart's ligament downwards into the subcutaneous tissues of the thigh. The abdominal wound was closed with a series of thick silk sutures passing through all the layers of the abdominal wall except the skin, which was closed separately. The thick silk sutures were intended to form permanent channels for the passage of the peritoneal fluid into the subcutaneous tissues. Some good results were obtained by Handley and also by Stoney and Moorhead.*

Paterson** inserts flanged tubes of glass between the peritoneum and the subcutaneous tissues at a point well below the umbilicus. As these tubes would soon become plugged by omentum, Paterson cuts away the omentum at a higher level. In several cases relief was obtained from ascites due to malignant disease as well as to hepatic cirrhosis.

It seems to the writer that at least some of the good results obtained by omentopexy, especially where the omentum is fixed in a pocket formed for it in the abdominal walls (as in Narath's modification of the operation), are to be attributed to the drainage necessarily established into the areolar tissues of the abdominal wall.

Drainage of the peritoneal fluid directly into the blood-vessels has been suggested and carried out. This can only be justifiable when the ascitic fluid is sterile, and hence must be preceded by an examination of the fluid both by culture and inoculation.

The long saphenous vein has been chosen as the avenue of drainage because (a) it is conveniently situated, (b) it has efficient valves (the operation is contraindicated when varicosity of the vein renders its valves useless), and (c) it does not belong to the portal system. The operation consists in exposing and mobilizing about 4 or 5 in. of the vein, dividing it after ligating its distal segment, and then passing it through a subcutaneous tunnel to an opening made in the abdomen a short distance above Poupart's ligament. The open end of the vein is now sutured to an opening in the peritoneum, using Carrel's method of arteriorraphy. Out of 5 patients operated on by Ruotte, in 2 the result was negative; out of 3 operated on by Ito and Soyesima there was but one success, but that was secured in a man of thirty-eight years, who had been tapped seven times, had been subjected successively to omentopexy, renal decortication, and to an attempt at drainage into the subcutaneous tissues by means of a buried cannula. Castle gives a good description of the veno-peritonealostomy, as he calls the operation, in the *Journal American Medical Association*, December 30th, 1911.

From reasoning and from statistics, the writer feels justified in concluding: (1) That operations which promise even a very moderate amount of success are thoroughly proper in such a fatal condition as ascites due to hepatic cirrhosis; (2) that severe operations are improper because the patients are usually in very poor condition for resisting trauma; (3) that some form of omentopexy or of lymphangioplasty is much superior to mere paracentesis and is the operation of choice; (4) that where milder measures fail, drainage into the veins may be proper; but (5) that all means of direct anastomosis between the portal vein and inferior vena cava are probably unjustifiable.

THE ETIOLOGY AND CLINICAL ASPECT OF ASCITES.

By CHARLES HUGH NEILSON, Ph. D., M. D., of St. Louis.

Ascites is only a symptom and not a disease; hence the etiology is found in the diseased condition producing the ascites. From the diagnostic or the therapeutic point of view, medicinal and especially surgical, it is probably sufficient to state that ascites may, for instance, be caused by cirrhosis of the liver. However, the real cause of ascites is based on the physiology, physiological chemistry, and pathology of circulation. Nearly all the diseases which cause ascites are disturbances of the circulation, local or general.

The term dropsy is used to denote the condition in which there is an abnormal accumulation of lymph in the connective-tissue, and in the spaces including the large serous cavities of the body.

The lymph to which class ascitic fluid belongs is transuded from the capillaries. Normally there is an equilibrium between lymph formation and lymph absorption. Any increase in lymph formation with a normal absorption, or a normal production with decreased lymph drainage, will cause a dropsical condition. Except in rare instances, we can probably disregard decreased lymph absorption, since the lymphatic vessels anastomose so freely that free lymph drainage generally prevails. In a study of ascites we must therefore concern ourselves with a study of increased lymph production.

Before taking up in detail the reason why any given disease causes ascites, we will review the various theories which have been advanced to explain the formation of lymph.

The first of these theories is the purely physical filtration theory of Ludwig. According to Ludwig the process depends on the intracapillary pressure. The pressure in the capillaries being higher than in the surrounding tissues, the lymph transudes through the capillary wall. In the production of lymph in the normal body this theory, to the writer's mind, does not explain lymph formation; but in ascites and some cases of edema, where we undoubtedly have an increased intracapillary pressure due to mechanical causes, it certainly is an important factor.

Heidenhain, in his secretory theory, holds that the endothelial cells of the lymph-vessels actually secrete the lymph from the blood and that this secretion is independent of the blood-pressure. While this theory is supported by many experiments, it probably is not a factor in the production of ascites, although it may be in normal lymph production.

Cohnheim, many years ago, argued that the chief cause of lymph formation was the permeability of the capillary wall. Starling revived

and accentuated this factor. By experiments, he found that the lymph from the extremities normally contains 2 to 3 per cent. protein; from the intestines 4 to 6 per cent.; and from the liver 6 to 8 per cent. Hence he concludes that the liver capillaries and mesenteric capillaries normally are more permeable than those of the extremities. This author also finds that certain substances, which he calls lymphagogues, increase the flow of the lymph; and he thinks these substances act on the capillary wall by increasing its permeability. He also states that decreased oxidation, or the circulation of toxic materials, increases the permeability of the capillary wall. We see the importance of Starling's work for the production of ascites in (1) the greater permeability of the capillaries of the abdominal organs; (2) in that this permeability may be increased by pathological conditions.

Another factor which is of the greatest importance in the production of dropsy is osmotic pressure. Any pathological condition such as decreased oxidation or any perverted metabolism may cause a heaping up of chemical products in the tissues. This results in a difference of concentration on the inside and outside of the capillary wall. Consequently a change of liquid must take place; the flow is into the tissues, and edema results.

Fischer, in his work on edema, holds that the chief cause of edema resides in the tissues. He claims the tissues are colloids and as such absorb water from any available source. He says with lack of oxygen, or with some pathological metabolic process, the tissues become acid in reaction, and act as colloids do when they are made acid—that is they absorb water and swell.

Fischer's theory explains the transfer of water into the tissues in case the tissues become acid, which is questionable. It does not explain the transfer of the protein and salts found in dropsical fluid. However, it seems to the writer that Fischer's work is well worthy of consideration, and that it will serve as a basis for further research on this complicated problem. A point in its favor is that it is along the line of modern biological research.

Carlson, Greer and Becht have recently advanced a theory of lymph formation based on experimental data. This theory is that the normal tissues secrete a hormone or stimulating substance which actually stimulates the endothelial lining of the capillaries, and that the lymph is actually secreted by the capillary wall. In other words, they think that Heidenhain is correct in his theory.

Now, where does this review of these various theories lead us in the pathological process which causes ascites? The writer thinks it is probably true that none of these theories is sufficient of itself to explain the physiology of ascites, but that several of the aforementioned factors are concerned in this process. In his opinion, increased intracapillary pressure and capillary stasis, together with increased permeability of the

capillary brought on by the decreased oxidation, are of the greatest importance. These two factors, together with the osmotic pressure-relations between tissue and capillary, will explain the process. It is possible that Fischer's work may explain the transference of water, and a changed permeability the transference of protein and salts. Before applying the above theories to the actual conditions causing ascites, let us classify some of the main causes of ascites from the clinical standpoint.

(1) *Ascites of a Mechanical Origin.*
  (a) Heart failure with venous stasis.
  (b) Cirrhosis with portal stasis.
  (c) Tumors, etc., obstructing vena cava or portal vein.
  (d) Thrombosis of portal vein.
  (e) Pylephlebitis.
  (f) Massive carcinoma of liver with portal stasis.

(2) *Ascites of Renal Origin.*

(3) *Ascites in Diseases of Female Sexual Organs.*
  (a) Multilocular cyst with ascites.
  (b) Myomata of uterus with ascites.

(4) *Ascites of the Anemias, Cachexias, and Marasmus.*

(5) *Inflammatory Ascites.*
  (a) Tubercular and other forms of ascites.
  (b) Malignancy of abdominal organs and peritoneum.
  (c) Syphilis of liver.
  (d) Hepatitis and parahepatitis.

(6) *Chyloform Ascites.*
  (a) Chylous ascites.
  (b) Ascites adiposus.
  (c) Pseudochylous ascites.

How can we apply the theories of lymph formation to the ascites of mechanical origin? In all these cases we have a venous stasis. This stasis gradually increases, and the blood is forced back into the capillaries causing an increase of the intracapillary pressure. Coincident with this rise of pressure, we have a slowing of the capillary circulation. This stasis and intracapillary pressure causes a stretching of the capillary wall with a resulting changed nutrition, and probably causes increased permeability of the same. In addition to this capillary wall change, we have, on account of the stasis, a decreased oxidation of the waste products in the tissues. This decreased oxidation results in an increase of the chemicals in the tissues. We have, therefore, an ideal condition for the force of osmotic pressure to exert itself—namely, an increased concentration of chemicals in the tissues, a lesser concentration in the capillaries, and a more permeable membrane between. This causes an outpouring of liquid into the tissues, and this process continuing will eventually cause ascites.

In case of ascites, due to heart failure, the decreased suction-power

decreases the lymph drainage, and this aids in the heaping up of the waste products. Another factor, which aids the production of ascites of the mechanical type, is the anatomical fact of the great vascularity of the abdominal cavity and its organs, together with the greater normal permeability of its capillaries as Starling has shown.

We have classified cirrhosis of the liver as a mechanical cause of ascites. However, it is true that the ascites of cirrhosis is only in part caused by mechanical obstruction. It has no doubt been observed by many of you that in cirrhosis, acites may develop early, long before there is any attempt to form a collateral circulation. In those cases we are dealing probably with a hepatitis, parahepatitis, or peritonitis; and this explains the ascites.

Leudet has described chronic peritonitis in alcoholic patients with ascites, when the condition of the liver could not have produced mechanical obstruction to the circulation.

Many authors state that cirrhosis is frequently associated with tuberculosis, which may account in part for the ascites. Post-mortems rather frequently show evidences of inflammation in the peritoneum of the liver and neighboring organs.

Dieulafoy reports a case of atrophic cirrhosis where he found phlebitis of the small veins of the stomach, intestines, and mesentery. He says: "If further researches show this to be frequently the case, we have another cause for ascites in cirrhosis."

In a study of ascites in renal disease the mechanical element is found as a terminal result of the nephritis—failing heart, enlarged liver, etc.

Again it must be remembered that we have so-called terminal in-inflammations of the great serous sacs, such as pericarditis with effusion, pleurisy with effusion, and peritonitis with effusion. These mechanical and inflammatory causes of ascites in nephritis are the results of a systemic disturbance which produces a general dropsy long before their terminal results appear.

The dropsy in acute nephritis is evidently produced by some toxic condition, as it generally follows scarlet fever, tonsillitis, diphtheria, or some other severe toxic disease. This toxic material acts directly on the capillary wall, and makes it more permeable; or it initiates a pathological nutrition which causes an increased permeability. Sooner or later an anemia develops which possibly results in decreased oxidation of waste products; the osmotic pressure exerts itself, and, with the increased permeability, general dropsy with ascites results. In chronic nephritis, both parenchymatous and interstitial, probably the same explanation holds. In the chronic type we have an added factor in the high blood-pressure. This probably has no effect, as dropsy is more common in the parenchymatous type than in the interstitial; but in the parenchymatous nephritis the blood-pressure is as a rule lower than in the interstitial.

In all nephritic conditions the retention of solids, principally sodium

chloride, without doubt plays an important part. This retention aids in an increase of chemical constituents in the tissues, and thus the osmotic pressure becomes a big factor as a cause of ascites in nephritis.

This retention of solids seems to be borne out by the work of Rztentkowski, who found the lowering of freezing point of edematous fluid in nephritis to be 0.583°, while in tubercular peritonitis it was only 0.526°. These experimental data indicate that the retention of chlorides and the solids must be regarded in the production of ascites in nephritis.

The ascites which is found in anemias, cachexias, and marasmus is the manifestation of a systemic increase in the formation of lymph. The cause is probably based on metabolic changes in the capillaries and tissues.

The ascites which often accompanies disease of the ovaries, the so-called multilocular cysts of the ovaries, is caused occasionally by mechanical obstruction to the abdominal and pelvic blood-supply. Generally, however, it is caused by the fact that these tumors are secreting bodies; and changes in their permeability or rupture may cause the ascites. Again, there is a relation between the rapidity of growth of such tumors and the presence of ascites.

The explanation of the ascites often found in myomata of the uterus, in case these tumors are large, is probably mechanical. In cases where these masses are small or so situated as to cause no mechanical obstruction, no explanation seems to give a casual relation between these tumors and the ascites.

The cause of the ascites, in the various inflammations of the peritoneum and coverings of the abdominal viscera, hardly needs review. We might merely remark that all the factors previously mentioned are probably potent in this condition.

The last class of ascites to which the writer has referred—namely, chyloform ascites, is occasionally met with.

The first variety of this, chylous ascites, is due, in the majority of cases, to rupture of the thoracic duct. Some other cases are due to pressure on the thoracic duct by tumors, etc. The fluid in these cases generally contains sugar and about 1 per cent. of fat. A second variety, ascites adiposus, is found most often in carcinomatus and tuberculous exudates from the peritoneum. These cellular elements and other detritus in the exudate undergo fatty metamorphosis. The resulting fluid has no sugar, and the fat may reach 6 per cent.

A third variety, pseudochylous ascites, according to Strauss, is found most often in chronic parenchymatous nephritis. This fluid contains no fat but is milky in appearance. Joachim says this is due to lecithin in combination with globulin. One might hazard a guess that it is lecithin in a colloidal solution, as this substance is changed into that condition rather easily. The cause is not known.

From this discussion of ascites we see that it is only a symptom

of disease. Its course and duration will then be governed by the course of the original disease.

The diagnosis of ascites is usually easy, but to determine its real cause is often more difficult. Many mistakes have been made by diagnosing syphilis of the liver as a cirrhosis. In fact, the differential diagnosis between them is often most difficult. We are often surprised that a case, which we have named cirrhosis, clears up under syphilitic treatment.

The difficulty of diagnosing so-called atrophic cirrhosis from ovarian cysts is evident to all.

Certain forms of peritonitis, such as chronic tubercular peritonitis, have all the symptoms of cirrhotic hepatism; hence the scrutiny must be most careful in order to distinguish between them.

In chronic nephritis, as a terminal result, we often have an atrophic or a fatty liver; we often have a terminal inflammation of the peritoneum; we often have a heart failure. The ascites fails to clear up as the general anasarca disappears under treatment, and we are surprised unless we keep in mind these terminal complications.

In diagnosing ascites we must remember that large fluctuating tumors and encysted inflammatory exudates from any of the abdominal organs may simulate ascites.

In the treatment of ascites we must not forget that the cause may lie far deeper than the disease apparently causing the ascites. We must remember that in many cases of ascites we have a systemic disturbance due to lack of oxygen, to circulation of toxic agents and a retention of solids.

In all cases of ascites with anemia from any cause, surprising results are often produced when the anemic condition is overcome. The general eliminative treatment, so often used in ascites, may produce its results, not by the removal of liquid, but by the elimination removing toxic materials which act on the capillary wall; in fact, the writer believes this is one of the reasons why the eliminative treatment is so variable in its results.

In the treatment of ascites in general, we must not forget that there may be retention of solids; and, although in a given case there may be no retention, the writer thinks it is perfectly rational to use a salt-free diet, remembering that definite results ought not to be expected for several weeks after the treatment is commenced.

The treatment of ascites may be summed up by saying that a certain number of cases fall properly into the hand of the surgeon, a certain number are purely medical in their treatment, while others must be left in the hands of Providence.

THE EXAMINATION OF CEREBROSPINAL FLUID.

By Arthur D. Dunn, A. B., M. D., of Omaha, Neb.,

Professor of Medicine, John A. Creighton University Medical College,

AND

Geo. A. Stevens, M. D., of Omaha, Neb.,

Associate in Medicine, John A. Creighton University Medical College.

Observation has convinced us that the examination of the cerebrospinal fluid is, broadly speaking, a too little appreciated diagnostic asset. Kaplan[*] states: "The time is at hand when we will be able to exclude spinal cord or meningeal changes from a thorough analysis of the cerebrospinal fluid. Tabes will receive its support from the laboratory, and negative serological findings will, as a rule, be obtained with normal cords, with healthy membranes only." Lumbar puncture should not be employed indiscriminately, but only in cases in which the diagnosis is doubtful and "its establishment necessary in the interest of the patient."[**]

It is our purpose to direct attention to some conditions in which an examination of the cerebrospinal fluid is not usually made, but by which valuable information may be obtained. Our deductions will be based mostly upon forty-two personal observations made since January 1st, 1911, and on a study of the recent literature. In most instances a cell-count, a Noguchi globulin reaction, a Fehling's test (Haines), and a Wassermann test were made. The cases have all been studied clinically. With the exception of 5 cases (Douglas County Hospital), all appeared in the routine of private practice. Therefore, the series is not large but diversified. Several cases are not without importance to certain, as yet unsettled, questions. The conditions to which we wish to direct attention are:—

1. Traumas and traumatic neuroses.
2. Other diseases of the brain or membranes accompanied by hemorrhages.
3. Tertiary and parasyphilitic cerebrospinal manifestations.

Trauma.

Lumbar puncture is of great value in injuries of the head or spine where intracranial or intraspinal hemorrhage is in question. One may be confronted with a case in which the differential of concussion (commotio

cerebri) and hemorrhage must be made. The presence of blood in the cerebrospinal fluid is a demonstration *ad oculum* of a hemorrhagic traumatic affection of the central nervous system, if care has been taken to exclude blood incident to the puncture. Tuffier and Millian* go too far in asserting that the presence of blood in the cerebrospinal fluid, in the course of cranial traumatism, is sufficient to establish the diagnosis of fracture, and that a clear fluid excludes it. The value of the procedure in the relief of pressure is obvious, for it may save trepanning. The value of negative fluid in ruling out hemorrhage is unknown to us, as our experience has been limited to 6 cases.** The literature consulted is silent on this point.

E. M. was a well-developed adult male who suffered a head trauma in a fall from a motor-cycle. At first unconscious, he recovered sufficiently a few moments later to recognize friends, and then lapsed rapidly into a stupor.

Status Præsens.—The patient is stuporous and the breathing is stertorous. He rises to vomit occasionally, and struggles and moans. There is a large irregular gash, two inches long, anterior to left ear and a fracture of the malar bone. There is a small scalp wound in the left posterior parietal region. The left internal rectus is paralyzed. A paralysis of both upper branches of the left facial can be explained by the injury to the nerve in its course anterior to the ear; fourth, fifth, sixth, eighth, ninth, tenth, eleventh, twelfth nerves are intact as far as can be ascertained. There is no paralysis of the extremities. The deep reflexes are slight but present. The abdominals are sharp. A record of the pulse for the next forty minutes is as follows: 60, 60, 64, 60.

Examination half an hour later: Results same except that the right knee-jerk is much increased over the left; both are much sharper than before; both right abdominal reflexes are absent. The Oppenheim and Gordon reflexes have appeared on the right; Babinski is absent.

Lumbar puncture was performed and about 12 c.cm. of bloody fluid withdrawn. Half an hour later the difference in the knee-jerks was not so marked, the right abdominals had reappeared, the pulse had risen to 68, to stay there or above until morning, except for one count of 60 in a half-hourly record. Twelve hours later patient conscious, but disorientated; reflexes good. Two punctures were made later to relieve pressure, with good effect. The squint disappeared. Recovery was slow but uneventful.

Post-traumatic inflammations occasionally occur, in which the examination of the spinal fluid tells us whether we are dealing with a slowly absorbing clot or with secondary infection of a previously existing blood-clot. Curschmann† advocates lumbar puncture in all cases of traumatic

---

*Quoted by Crouzon, Pierre Marie. *Neurologie Pratique*, Paris, 1911.
**Only one of these cases occurring since January 1st, 1911 is included in our table of cases.
†Ueber der Therapeutische Bedeutung der Lumbalpunktion (*Deutsche Med. Wochenschr.*, No. 39, 1910. Abs. *Therapie der Gegenwart*, June, 1911).

neurosis. He believes that in the future if *Kopftraumatiker* are punctured as a routine, in not a few cases we shall have to revise our views as to the pure functional character of these conditions. The intraspinal pressure is much increased as a rule; by the relief of this tension, Curschmann claims to have produced striking cures.

OTHER BRAIN AND CORD DISEASES ACCOMPANIED BY HEMORRHAGE.

(1) *Pachymeningitis Hemorrhagica Interna.*—This pathological condition, characterized by more or less transparent detachable fibrinous membranes, often saturated with blood pigment, or accompanied by more or less extensive hemorrhages, occasionally gives rise to confusing and puzzling symptoms. It occurs commonly in paretics, alcoholics, arteriosclerotics, cardio- and nephropaths. Curschmann reports 3 cases in which puncture not only made the diagnosis, but in 2 cases produced a cure which has already lasted over three years. We have notes of a case seen with Dr. Paul Ellis, of Omaha, in which a pale-yellow hemoglobin-containing fluid with a pleocytosis suggested the diagnosis in an acute paretic,—later confirmed by autopsy.

(2) *Brain Tumors.*—Examination of the cerebrospinal fluid in an apoplectiform attack in a case previously showing symptoms of tumor might establish the diagnosis of hemorrhage in a glioma.

(3) The spinal fluid may afford information in apoplectic insults. A positive finding would differentiate hemorrhage from embolism or thrombosis. It is a question if puncture is here justifiable.

TERTIARY AND PARASYPHILITIC AFFECTIONS.

It is in the late manifestations of lues in meninges, cord and brain, that the greatest advances are being made from the study of the cerebrospinal fluid. The diagnosis of early paresis, tabes imperfecta, and cerebrospinal syphilis offers some of our most difficult problems. The meningeal forms of tabes and paresis manifest themselves at some stage in the form of an exudate in the spinal fluid. Examination of the cerebrospinal fluid in suspected cases should be preceded by a careful history and clinical study of the patient; this should include the treatment for the previous six months, because mercury and potassium iodide have a marked influence on the pathological content of the fluid. In such a case changes might persist in the membranes without conclusive evidence in the fluid.

METHODS OF STUDY.

Reducing Substances.—7 to 10 drops of spinal fluid are added to 3-4 c.cm. of a diluted Haines' solution. It is necessary to set the tube aside for an hour to determine the existence of a reduction. A reducing substance is present in all normal fluids. It is fairly certain that all acute

DISEASE	No.	Wassermann Blood	C. S. F.	Noguchi	Reduction	Cells	Organisms
Tabes	1	—	—	+	Purple hue (slight)	126	—
	2	—	—	+	"	40	
*	3	—	—	+++	?	?	—
	4	—	—	+	—	50	—
	5	++++	++++	++++	—	120	—
	6	+++	—	+	+	8	—
	7	—	—	+	+	8	—
	8	—	++++	+	+	12	—
	9	—	+	+	+	30	—
Paresis	1	—	—	++	+	80	—
**	2	?	—	+	+	4	
	3	—	++++	+++	?	184	
***	4	—	+++	+	+	10	
Polio. Enceph. ****Syphilitica	1	—	—	—	+	80	—
	2	—	++	++	Purple +	140	—
	3	—	+	+	+	5	
Diffuse Cerebrospinal Syphilis	1	+	+	++	?	?	
	2	—	—	++++	+	300	
Meningitis	1	?	—	++++	—	400	Tubercle Bacilli
	2	?	—	++++	—	350	Streptococcus
	3	?	—	++++	—	?	Diplococcus M
	4	?	—	++++	—	250	Diplococcus
Jacksonian Epilepsy (Cause unknown) (Post-traumatic)	1	—	—	—	+	—	
	2	—	—	—	+	2	
Tumor and Spinal Cord (?)	1	—	—	++	—	3	
Meningismus	1	?	—	—	+	—	—
Paralysis Agitans	1	—	—	—	+	—	—
Polyneuritis (Lead)	1	?	—	+	—	12	—
Uremia	1	?	—	—	+	2	
Multiple Sclerosis	1	—	—	—	+	5	
Hydrocephalus	1	?	—	—	+	2	
Chronic Alcoholism	1	—	—	—	+	—	
Transverse Myelitis	1	?	—	+	Purple	5	
Neurasthenia	3	—	—	—	+	2-5	
Combined Degeneration	1	?	—	—	+	4	
	2	?	—	—	+	0	
Lead Encephalopathy *****	1	?	—	+++	+	3	
Taboparesis	1	++++	++++	++	+	7	
Poliomyelitis	1	?	—	+	+	36	
Hemorrhage Intra-cranial	1	?	?	++	+	2	(Puncture one week after accident)

*The case had been thoroughly mercurialized and iodized. Salvarsán had also been given.

**Autopsy.

***This case had been diagnosed depressive mania. His condition is unimproved after four months.

****All these cases had been treated.

?Reaction or test not made. Some of these cases were only seen once, which made it impossible to carry out all tests in several instances.

*****A careful examination (C. F. Crowley) failed to reveal even a trace of lead in the cerebrospinal fluid.

meningitides are associated with an absence of the reducing substance. A reducing substance is present in chronic meningitides, and thus differentiates them from acute. A peculiar violet color reaction often takes place where a large number of neutrophiles are present. The reducing substance begins to disappear twenty-four hours after the onset of an acute meningitis, and its place is taken by the violet color reaction.

The Globulin Reaction.—This was performed according to the technique of Noguchi as follows: To .1-.2 c.cm. cerebrospinal fluid, .5 c.cm. of a 10 per cent. butyric-acid solution in normal salt is added and gently boiled for a few seconds; then .1 c.cm. normal sodium hydrate is added, the solution boiled again and set away to cool. A flocculent precipitate indicates the presence of an excess of globulin. The intensity of the reaction roughly estimates the amount of globulin present. It is always present in meningitis, tabes and paresis; it is not uncommon in cerebrospinal syphilis. In addition, we have found it in lead polyneuritis, postpneumonic transverse myelitis, and acute anterior poliomyelitis. Its absence in two pronounced cases of combined degeneration is to be noted. A strong reaction was found in cerebrospinal fluid that was taken eight days after a traumatic intracranial hemorrhage. This straw-colored fluid contained neither hemoglobin, red corpuscles, nor white cells. In syphilitic diseases of the nervous system, the globulin may disappear early under treatment. It commonly keeps pace with the cell content, but the latter is much more slowly influenced by treatment than the former. Globulin, except in traces, is an abnormal content of the cerebrospinal fluid, and indicates organic disease of the central nervous system.

Cell Count.—Technique: Numerous methods have been advocated. The liability of error is obvious in the early French methods in which cerebrospinal fluid is centrifuged at a given speed in a tube of fixed length and size for a definite time, the sediment to be collected in a certain manner from the side of the tube, and to be spread to a certain thickness on a slide; the slide is then stained, and the number of cells per field is counted. Of the counting-chamber methods, the best known are that of Laignel-Lavastine, who centrifuge the fluid and count the cells on a Thoma-Zeiss counter, and the Fuchs-Rosenthal method which necessitates a special pipette. The method recently given by Bybee and Lorenz is very accurate, but is time-consuming, and it is doubtful if for the diagnostician it repays the expenditure of energy. Inasmuch as absolute accuracy is of little clinical moment because interpretation is based on coarse differences only, we have employed a rough method which has simplicity to recommend it. To 2-4 c.cm. of the thoroughly shaken spinal fluid, 1 drop of 50 per cent. acetic acid is added to bring out the nuclei. The fluid is again shaken; a drop is then transferred with a pipette to the ordinary blood-counting chamber with the Tuerck ruling. Nine-tenths cubic millimeter can be easily counted in one chamber, and the result is sufficiently accurate for clinical deductions.

The percentage of error from the added fluid varies from about 1 to 3 per cent., which, from a clinical standpoint, is negligible.

Since the work of Widal, Sicard and Ravaut in 1903, an occasional investigator has busied himself with the number and morphology of the cells. The normal content is given by various observers from none to 5 per cubic millimeter. In acute meningitic processes, exclusive of tuberculous, polymorphonuclears predominate; in syphilitic, the lymphocytic type. Purves Stewart,* in his series of cases, gives the average as 141 per cubic mm. in paresis and 125 plus in tabes. Pleocytosis is one of the most constant signs of tabes. It occurs just as regularly in the imperfect as in the advanced cases; further it may be missed in progressed, just as in imperfect, cases (Nonne).** Both the globulin reaction and pleocytosis occur in tabes and paresis almost without exception. They are of immense importance in supporting an Argyll-Robertson pupil, or in helping to explain an unaccountable neurasthenia, alteration in character, adult epileptic attacks, discrepancy in reflexes, suddenly appearing squints or ptosis, so-called congestive attacks, etc. When there is neither globulin reaction nor pleocytosis, the meninges are normal (Kaplan). That one or both occur occasionally in other conditions does not impair their usefulness, *e. g.*, tuberculous meningitis, brain tumor, arteriosclerotic dementia, non-syphilitic psychoses, multiple sclerosis, anterior poliomyelitis, etc. The degree to which these reactions occur is in most cases, except tuberculosis, much less than in syphilitic processes. An absolutely negative spinal fluid in an untreated case excludes tabes or paresis. The presence of both points absolutely to organic disease of the cerebrospinal system, the nature of which must be differentiated by other means or by time.

Wassermann Reaction.—Serological investigations of the cerebrospinal fluid were begun immediately after the perfection of the Wassermann technique. Biologically it has been of significance in supporting the syphilitic theory of the etiology of paresis and tabes. It is helping to classify psychoses which were formerly of unknown or suspect etiology. In the early diagnosis of the parasyphilides and in the differential of cerebrospinal syphilis the test has become a necessity. It was found, however, that the Wassermann reaction formed only one link in the diagnosis of luetic nervous diseases, and could not supplant a carefully taken anamnesis and thorough examination. We have learned that a positive serum Wassermann reaction means that a given serum has complement deviation properties, but it does not prove that the nervous symptoms from which a patient is suffering are specific. For example, a multiple sclerosis or a brain-tumor patient may have syphilis, his blood-serum may still react positively, but interpretation of his symptoms on this basis alone would lead to therapeutic and prognostic chagrin. The spinal fluid

*The Diagnosis of Nervous Diseases. London, 1908.
**Journ. Amer. Med. Assoc., July 24th, 1909.

always reacts negatively in syphilis without nervous manifestations; hence, a positive reaction in the spinal fluid means syphilitic involvement of the central nervous system (Plaut, Nonne and others). Kaplan makes the one exception of the yellow fluid sometimes obtained. The severity and duration of the affection determines the intensity of the reaction which appears very early in the cerebrospinal fluid. It is of greatest value in unmasking insidious parasyphilitic affections at a time at which much can be expected from a vigorous therapy.

Plaut maintains that paresis can be excluded on a negative serum reaction. This statement is probably too sweeping and is denied by Kaplan* and others. The latter states: "It is not uncommon to miss a positive Wassermann reaction in the serum and cerebrospinal fluid of a luetic candidate for general paresis and at the same time find a pleocytosis and a globulin excess." The cerebrospinal fluid reacts positively in 90/100 per cent. of paretics. In one of our cases, a depressive psychosis, the serum reaction was negative, but the cerebrospinal fluid furnished a well-marked globulin reaction, pleocytosis, and a frankly positive Wassermann reaction. His condition remains unimproved after three months. The value of such conclusive reactions is obvious. One has only to cite the medico-legal aspects of paresis following trauma to indicate the advantages of a specific test in this field.

Plaut's** statement that the absence of a positive Wassermann reaction in the cerebrospinal fluid differentiates cerebrospinal syphilis from paresis is based on too few cases. According to this observer, positive reactions in the blood, ceteris paribus, may mean either cerebrospinal syphilis or paresis. If the reaction is present in the cerebrospinal fluid, it excludes cerebrospinal syphilis.

In our series there are two clinically typical cases of polioencephalitis syphilitica with positive globulin reactions, cell counts of 140 and 5, negative blood-serum and positive (++++) cerebrospinal fluid Wassermann. Both cases showed typical Millard-Gubler syndromes. There were neither psychic nor sensory disturbances in either case. The first case improved markedly under mercury; the second case was stationary after a vigorous specific therapy. These two observations, exceptional as they appear, overthrow Plaut's dictum that a positive cerebrospinal fluid Wassermann rules out cerebrospinal syphilis. A case of cerebrospinal syphilis with paraplegia, which had improved markedly under thorough treatment, showed globulin (+++), cells 300, and a negative Wassermann in both serum and cerebrospinal fluid.

The following case illustrates the use of the reaction in the interpretation of ambiguous clinical manifestations:—

Case II.—W. X., æt. forty-five, single. Saloonkeeper. Hard smoker and drinker. Syphilis twenty-five years ago, for which he had repeatedly

*Loc. Cit.
**The Wassermann Sero-Diagnosis of Syphilis in Its Application to Psychiatry. New York, 1911.

taken treatment. For several months patient has not felt normal. He complains of being cross, irritable, and morose. Formerly he was very fond of company, now does not care to see anybody; keeps to himself; cannot think clearly; his eyes burn and his muscles twitch; sleeps well; eats well.

Examination.—The patient was a well-developed adult male. There was a slight facial asymmetry, probably congenital. Extrinsic eye-muscles were normal. The right pupil was square, reacted to distance, but not to light. The left pupil was smaller than the right and reacted poorly to light. The fundi were normal. There was a marked fine tremor. The deep reflexes were all exaggerated. The liver was enlarged 1½ fingerbreadths below costal arch, was not tender and was of normal consistency. The spleen was not palpable. The urine was normal except for a rather pronounced aldehyde reaction which later disappeared. A serum Wassermann reaction made several months previous was negative. The cerebrospinal fluid came under considerable pressure, but was clear. Haines' test (+), globulin (++), lymphocytes 10, Wassermann (++). An intravenous injection of salvarsan with mercury internally was followed by restoration to his normal condition.

Conclusions.

(1) Lumbar puncture should be resorted to almost as a routine in serious traumata of the central nervous system and in post-traumatic neurasthenia both as a diagnostic and therapeutic procedure.

(2) Inflammatory affections of the brain and cord cause definite changes in the cerebrospinal fluid. Acute and chronic inflammatory affections (the so-called degenerative inflammatory types) can be differentiated by examination of the cerebrospinal fluid.

(3) Simple degenerative conditions such as combined degeneration, and the degeneration of pernicious anemia may cause no manifestations in the cerebrospinal fluid.

(4) Parasyphilitic processes can be diagnosed in their earliest stages only by serological methods. Only in their early or exudative stages can we hope for curative therapy.

(5) The effect of therapy may be checked up by occasional examinations of the cerebrospinal fluid.

(6) A positive Wassermann reaction may occur in the cerebrospinal fluid in cerebrospinal syphilis.

800-806 Brandeis Theatre.

MEDICAL AND SURGICAL PROGRESS.

THE OATMEAL CURE IN DIABETES.

A REVIEW OF RECENT LITERATURE.

By S. STROUSE, M. D., of the Editorial Staff.

1. Falta (*Zeitschr. fuer klin. Med.*, 1907 and 1908).
2. Schade: Die Bedeutung der Katalyse fuer die Medizin, 1908.
3. Strauss: Vorlesung ueber Diætbehandlung innerer Krankheiten. Berlin, 1909.
4. Lampé (*Zeitschr. fuer diæt. und phys. Ther.*, XIII, p. 209, 1909).
5. Croftan (*Journ. Amer. Med. Assoc.*, LII, p. 1313, 1909).
6. Von Noorden: Die Zuckerkrankheit, 1910.
7. Mohr (*Muench. med. Wochenschr.*, p. 1414, 1910).
8. Luethje (*Therap. d. Gegenwart*, Vol. LI, No. 8, 1910).
9. Klotz (*Zeitschr. fuer exper. Path. und Therap.*, Vol. IX, p. 600, 1911).
10. Magnus-Levy (*Berl. klin. Wochenschr.*, XLVIII, p. 1213, 1911).
11. Jastrowitz and Buettenmueller (*Zeitschr. fuer exper. Path. und Therap.*, Vol. IX, p. 365, 1911).
12. Blum (*Muench med. Wochenschr.*, LVIII, p. 1433, 1911).
13. Abt and Strouse (*Amer. Journ. Med. Sciences*, March, 1911).
14. Foster (*Amer. Journ. Med. Sciences*, February, 1911).
15. Baumgarten and Grund (*Deutsch. Archiv fuer klin. Med.*, CIV, p. 168, 1911).
16. Lang (*Zeitschr. fuer exper. Path. und Therap.*, IX, p. 279, 1911).
17. Burker (*Verhandlung. d. 28 Kongr. fuer innere med. Wiesbaden*, 1911).
18. Boruttan (*Ibid.*).
19. Naunyn: Diabetes Mellitus.

Although there have been several dietetic cures of diabetes based on the use of a single kind of carbohydrate, only one has survived the test of time and is still generally employed. The oatmeal cure of Von Noorden was the result of an accidental discovery of the effects of oatmeal gruel in a diabetic for whom it was being prescribed on account of some intestinal disturbances. Further clinical investigation showed that under certain restrictions the employment of oats in severe cases of diabetes offered a remarkably striking and apparently paradoxical result —namely, a reduction in the sugar output and a diminution of the acidosis. At first sight it seems almost impossible that the addition of any carbohydrate to the diet of a person, whose assimilation for carbo-

hydrate foods is disturbed, should produce any but harmful results; yet one fact stands out prominently in almost all the literature—that oatmeal, properly used, will improve cases of diabetes which have resisted the ordinary dietetic and medicinal means. The mode of action is still not understood, which is not surprising in view of our very limited knowledge of the actual cause of the disease; but much work is now being done which promises to elucidate many obscure points.

For practical purposes one of the most valuable lessons to be derived from a review of the literature is the proper method of administering the cure. In the first place, it is inadvisable to use it in those mild cases which ordinarily react very well to the usual dietetic restrictions. Such cases have, in frequent instances, not only not been benefited but have been harmed; and it is to be emphasized that oatmeal cures should be held in reserve to be exhibited perhaps later in the course of the disease when much difficulty is experienced in properly controlling the disease. When, however, the usual limitations of carbohydrate intake either do not cause the desired diminution of sugar or tend to produce acidosis, the oatmeal cure will produce the most striking effects. The gruel itself is easily prepared. To 250 grm. cooked American oats are added 250 or 300 grm. washed butter, the whole thoroughly mixed while hot and divided into three or four portions to be served in one day. At each feeding one or two eggs may be added to the gruel, although the tendency now is to limit the day's food to the oats and butter. Some patients prefer to have their gruel fried, and there is no objection to serving it in the form of fried cakes. As much water as may be wanted is allowed, and a little light wine is always given in the German clinics. Absolutely no other food is to be given during the oatmeal days, and the treatment will be valueless if other carbohydrates or meat are allowed.

It has also been shown that it is not wise simply to interrupt the course of ordinary treatment by inserting haphazardly some oatmeal days. The patient must be carefully prepared, and the general object in the preparation is to get him as near sugar-free as possible. For this purpose Falta's regulations seem to be the most satisfactory. After as low carbohydrate as the patient can stand without danger, for two days before the cure, the patient is given nothing but vegetables of low carbohydrate content, then for three or four days the gruel, then two more days of vegetables, and in case the desired result is not obtained another course of oatmeal. In almost all cases by this time, as a rule, there is a marked reduction in the acidosis and a complete or almost complete reduction in the sugar output.

Von Noorden and, after him, others show that the results can be divided into four great classes depending on the reaction of the patient. The first group of cases includes those who are not relieved by the usual treatment, but in whom the oatmeal cure is sufficient to produce, not only a marked lowering of the acidosis, but also an increase in the sugar tolerance. In other words, the sugar in the urine disappears, and after the treatment the patient can assimilate more sugar than he was able to before. In these cases the oatmeal may be said to have a curative effect. In the second group the results are similar but are only temporary, and after the treatment the patient is no better off than formerly. In the third group the reaction is somewhat different. The glycosuria persists, but the acidosis is diminished, and after the oatmeal days the patient has a more or less decided increased tolerance for carbohydrate in his diet. The fourth group includes certain cases which show no reaction

whatever to the treatment. This group has been shown by most workers to include only a small number of cases.

While there is no scientific explanation for the variation in the reaction manifested by different patients, certain side factors have been shown to play a rôle. For instance, Umber emphasizes the influence of the psychic factor, but this point has not been extensively investigated by others. In children the oatmeal, properly used, has been proved to possess great value in increasing sugar tolerance and postponing the onset of acidosis. In the digestive disturbances which sometimes are met with, the oatmeal often seems to have a beneficial effect. It nevertheless may, of itself, produce diarrhea, or sometimes constipation, and often during the course of an oatmeal regime it is wise to resort to opium. In patients with diabetes on whom surgical procedures are necessary, a postoperative course of oatmeal often prevents the onset of coma. To summarize the results of practically all students of this question, we can say that the oatmeal treatment has a unique and most valuable place in the therapeutics of severe cases of diabetes, and that when properly used it will, in most cases, reduce the sugar output, diminish the signs of acidosis, and prolong the life of the patient.

The explanation of the mode of operation of the cure is still in the region of speculation. Von Noorden thought the effects were probably due to some unknown specific action of the oat starch. Naunyn does not believe that the gruel is absorbed, but believes that it is fermented in the intestines and that easily oxidizable products of fermentation are resorbed. In answer to this argument it is urged by the Von Noorden school that all clinical manifestations of intestinal fermentation, such as digestion disturbances and meteorism, are absent. Furthermore, they claim that the products of fermentation could not have such a favorable action on the ketonuria, and that were the sugar not assimilated the nitrogen retention which is common during the cure would not occur. Falta, whose studies of the whole matter are classical, thinks it possible that in the oats is a substance regulating the internal secretion of the pancreas, while Lampé conjectures that the effect is due to a difference in the chemical structure of the starch molecule. Schade holds to the view that some catalytic force is at work. Luethje has used a well-known phenomenon in the metabolism of dogs as a basis of another theory. If adult dogs are given large doses of milk, lactosuria is produced, but if the milk is continued long enough, the sugar disappears, due, it is believed, to the activity of a carbohydrate ferment brought from latency into activity by the exciting influence of the lactose in the milk. Reasoning by analogy, Luethje thinks that the oatmeal contains an excitant sufficiently powerful to call into active use glycolytic ferments, which then act on the carbohydrate of the oats.

Interesting as are all these theories, they all lack experimental proof of their contentions, and anyone may or may not be the correct explanation. Klotz has done an interesting piece of laboratory research which for the first time seems to offer an experimental basis for the results of the treatment. He followed Rosenfeldt's experiments on dogs in whom glycosuria has been produced by phloridzin. In such dogs, during periods of starvation, dextrose given by mouth prevented fatty degeneration of the liver, and was converted into glycogen and not oxidized. This is due to the path of the dextrose, which is termed the "hepatic transglycogenic way." But dextrose under the same conditions given intravenously did not prevent fatty degeneration of the liver, was not con-

verted into glycogen, and was well tolerated by the diabetic animals. This path is called the "anhepatic, aglycogenic way." Klotz worked on a large series of dogs which had been made diabetic by phloridzin. After feeding them during starvation with the various starches, he determined the fat content of the liver at autopsy. His result showed that oats went the anhepatic aglycogenic way and did not prevent the fatty degeneration of the liver, just as dextrose given intravenously did not prevent fatty degeneration of the liver. Barley, rice, potatoes took the anhepatic path in the order named, and wheat took the hepatic glycogenic way. Now the starches, which take the anhepatic path, are oxidized by the body and act as antiketonic agents, whereas those that traverse the hepatic path are converted into dextrose and are, of course, not available in the body economy which already is overwhelmed with an excess of dextrose. Consequently such starches have no antiketonic power. These experimental researches are in harmony with the observations of Von Noorden that oats, barley, rice, potatoes and wheat are tolerated by the diabetic in the order given. The occasional failure of an oatmeal cure also has an analogy in the experimental work, since Klotz found that occasionally there was a reversal of the usual procedure of the starches. In some instances Klotz found a fatty liver with wheat feeding and a glycogenic liver with oats, due probably to variations in the activity of the bacterial flora of the intestines.

On the other hand, Baumgarten and Grund could not corroborate the findings of Klotz on phloridzin-poisoned dogs, and they tried to attack the problem in another manner. They attempted to split the various meals into their component parts, and drew the following conclusions from their studies. The starch derived from oatmeal has no favorable action in diabetes, even in those cases where the whole meal had a beneficial effect. In a few mild cases the split starch may have some slight effect. Oat starch and wheat starch show practically no difference in their behavior in diabetes. The starch of wheat given by itself has a slightly more favorable action than mixed food of the same carbohydrate content. Oat preparations deprived of their starch are practically inactive as far as their therapeutic use is concerned, and for oatmeal to be of any service it must be employed as the whole meal. Jeannerets, however, thinks that he has shown a diminished sugar output when an alcoholic extract of oats is used.

Quite recently Blum appears as an iconoclast and again raises the question of the specificity of the reaction of the diabetic organism to oatmeal. He made comparative tests of the value of wheat meal and of oatmeal given under identical conditions, and claimed to have shown no fundamental differences in their behavior in severe cases of diabetes. He believed that undoubtedly beneficial results occur after the exhibition of oatmeal, but that the same results may occur after wheat meal. In either case the reasons for the reaction do not lie in the nature of the starch but in the condition of the patient. It is certainly true that the success of the oatmeal cure depends on the proper preparation of the patient by means of hunger days, vegetable days, and reduction in carbohydrate intake; and in these circumstances Blum sees the explanation of the good results, for during this time the patient can take care of the hyperglycemia and thus be prepared to oxidize the large amount of carbohydrate subsequently given. The use of a single kind of carbohydrate and the practical absence of protein from the diet are also of more importance than the nature of the carbohydrate, and in the 35 cases in

which Blum used wheat meal, he obtained results which compare very well with those usually obtained with oatmeal.

Jastrowitz and Buettenmueller did metabolism studies on 3 severe cases of diabetes in which the acidosis was markedly benefited by the oatmeal regime. They call attention to their ammonia and nitrogen determinations which show that despite a reduction of acidosis the ammonia output remained relatively high. They think that the ammonia coefficient is not an index of the acid intoxication, but rather of disturbance in liver function. Similar studies of Abt and Strouse on traumatic diabetes in children showed that the ammonia-nitrogen ratio was not an index of the acid intoxication; for, even when the ammonia output was reduced by the oatmeal diet, the coefficient might remain high on account of the low nitrogen excretion which results from a low protein diet.

Summary.

It is not very difficult to sum up the general views on oatmeal in diabetes. Practically all investigators, who have tested the cure in a thorough manner, agree that it is most beneficial, especially in severe cases where other means have failed to reduce either sugar output or signs of acidosis. Whether this action depends on any inherent quality of the oat starch is still a disputed point. The *modus operandi* must be considered as yet unexplained; numerous theories have been advanced, but none is supported by actual knowledge. Klotz's researches, if corroborated by other workers, may offer a scientific explanation of the phenomenon.

MODERN TENDENCIES IN THE TREATMENT OF ECLAMPSIA.*

A CRITICAL REVIEW OF RECENT LITERATURE.

By Hugo Ehrenfest, M. D., of the Editorial Staff.

1. Albeck: Eclampsia. (*Zeitschr. fuer Geb. und Gyn.,* Vol. 67, p. 131.)
2. Bailey: Shock in Eclampsia. (*Amer. Journ. Obstet.,* p. 260, 1911.)
3. Boissard: Treatment of Eclampsia with Large Bleedings, etc. (Orig. in French; Review in *Amer. Journ. Obstet.,* Vol. 62, p. 696.)
4. Cauwenberghe: Etiology of Eclampsia. (Abs. *Amer. Journ. Obstet.,* Vol. 59, p. 881.)
5. Cragin and Hull: Treatment of Eclampsia. (*Journ. Amer. Med. Assoc.,* p. 5, January 7th, 1911.)
6. Drennan: Abstraction of Calcium Salts from the Mother's Blood, etc. (*Amer. Journ. Obstet.,* p. 653, April, 1911.)
7. Ehrenfest: Renal Decapsulation in Eclampsia. (*Surgery, Gyn. and Obstet.,* p. 296, September, 1911.)
8. Engelmann and Stade: Placental Theory of Eclampsia. (*Zentralbl. fuer Gyn.,* p. 618, 1909.)
9. Engelmann: Hirudin in Treatment of Eclampsia. (*Zentralbl. fuer Gyn.,* p. 133, 1910.)
10. Engelmann: Treatment of Eclampsia with Intravenous Injection of Hirudin. (*Zeitschr. fuer Geb. und Gyn.,* Vol. 68, p. 640.)
11. Freund: Serumtherapy of Toxicoses of Pregnancy. (*Zentralbl. fuer Gyn.,* p. 963, 1911.)
12. Fromme: Treatment of Eclampsia by Means of Immediate Delivery. (Abs. *Zentralbl. fuer Gyn.,* p. 959, 1910.)
13. Frommer: Experimental Study of the Relation of Parathyroidal Insufficiency to Eclampsia. (*Monatsschr. fuer Geb. und Gyn.,* Vol. 24, p. 748.)
14. Gussakow: Symptomatology and Diagnosis of Eclampsia. (*Zentralbl. fuer Gyn.,* p. 781, 1911.)
15. Herrenschneider: Cure of Eclampsia by Means of Amputation of Both Breasts. (*Zentralbl. fuer Gyn.,* p. 673, 1911.)
16. Hirst: Treatment of Eclampsia. (*Amer. Journ. Obstet.,* Vol. 62, p. 421.)
17. Humpstone: Vaginal Cesarean Section in the Treatment of Eclampsia. (*Amer. Journ. Obstet.,* Vol. 59, p. 92.)
18. Jacobson: Treatment of Eclampsia by Continuous Sugar-Water Instillation. (*Amer. Journ. Obstet.,* Vol. 61, p. 871.)

*Vide The Etiology of Eclampsia by Hugo Ehrenfest. (INTERSTATE MEDICAL JOURNAL, February, 1912.)

19. Javal: Increase of Chlorides in the Blood in Pregnancy and Puerperium. (Orig. in French; Review in *Amer. Journ. Obstet.*, p. 313, 1910.)

20. Kaiser: Eclampsia and Parathyroidism. (*Zentralbl. fuer Gyn.*, p. 1240, 1907.)

21. Kawasoye: Functional Disturbance of Kidneys and Infusion of Saline Solution. (*Zeitschr. fuer Gynaek. Urologie.*, p. 309, 1909.)

22. Lichtenstein: Therapy of Eclampsia. (*Zentralbl. fuer Gyn.*, p. 962, 1911.)

23. Little: Treatment of Puerperal Convulsions. (*Journ. of Obstet. of British Empire*, Vol. 16, p. 145.)

24. McCarthy: Nitroglycerine in the Treatment of Eclampsia. (*British Med. Journ.*, May 23rd, 1908.)

25. Mangiagalli: Treatment of Eclampsia. (Orig. in Italian; Review in *Zentralbl. fuer Gyn.*, p. 1376, 1909.)

26. Mathes: Toxicology of Placenta. (*Zentralbl. fuer Gyn.*, p. 1548, 1908.)

27. Mayer: Serum of Normal Pregnancy as Remedy in Cases of Toxicoses of Pregnancy. (*Zentralbl. fuer Gyn.*, p. 350, 1911.)

28. Mayer: Treatment of Toxicoses of Pregnancy with Serum of Pregnant Women. (*Zentralbl. fuer Gyn.*, p. 1299, 1911.)

29. Mirto: Lumbar Puncture and Veratrum Viride in Eclampsia. (Orig. in Italian; Review in *Zentralbl. fuer Gyn.*, p. 188, 1908.)

30. Mitchell: Theory of Eclampsia. (*Medical Record*, November 19th, 1910.)

31. Moehlmann: Therapy of Eclampsia. (*Zeitschr. fuer Geb. und Gyn.*, Vol. 62, p. 79.)

32. Moran: Treatment of Eclampsia. (*Journ. Amer. Med. Assoc.*, May 2nd, 1908.)

33. Persson: Eclampsia in the Light of a Paresis Puerperalis. (Orig. in Swedish; Review in *Gyn. Rundschau*, p. 503, 1910.)

34. Peterson: Treatment of Eclampsia by Dilation or Incision of Cervix. (*Surgery, Gyn. and Obstet.*, p. 210, 1910.)

35. Peterson: Vaginal Cesarean Section in the Treatment of Eclampsia. (Transactions Amer. Gynec. Soc., 1911.)

36. Primo: Treatment of Eclampsia with the Stroganoff Method. (Orig. in Russian; Review in *Zentralbl. fuer Gyn.*, p. 354, 1908.)

37. Quadri: Parathyroid Treatment of Eclampsia. (Orig. in Italian; Review in *Journ. Amer. Med. Assoc.*, p. 1651, 1908.)

38. Reddy: Auto-Toxemia of Pregnancy. (Abs. *Journ. of Obstet. of British Empire*, Vol. 15, p. 129.)

39. Roth: Influence of Weather on Eclampsia. (Orig. in Russian; Review in *Amer. Journ. Obstet.*, Vol. 55, p. 691.)

40. Roth: Experience with Stroganoff Treatment. (*Muenchner med. Wochenschr.*, p. 247, 1911.)

41. Ruebsamen: Treatment of Pregnancy Toxicoses with Serum of Pregnant Women. (*Zentralbl. fuer Gyn.*, p. 778, 1911.)

42. Santi: The Mammary Theory of the Origin of Eclampsia. (*Zentralbl. fuer Gyn.*, p. 55, 1911.)

43. Schmid: Eclampsia Without Convulsions and Without Coma. (*Zeitschr. fuer Geb. und Gyn.*, Vol. 69, p. 143.)

44. Seitz: Eclampsia. (*Archiv fuer Gyn.*, Vol. 87, p. 78.)

45. Seitz: Eclampsia and Parathyroidea. (*Archiv fuer Gyn.*, Vol. 89, p. 53.)

46. Sellheim: Mammary Theory of Origin of Eclampsia. (*Zentralbl. fuer Gyn.*, p. 1609, 1910.)

47. Sippel: Dangers of Subcutaneous Infusion of Saline Solution in Eclampsia. (*Deutsche med. Wochenschr.*, January 1st, 1910.)

48. Skeel: Blood-Pressure, Leucocyte Count, etc., in Pre-Eclamptic Toxemia. (*Amer. Journ. Obstet.*, Vol. 59, p. 369.)

49. Stroganoff: Prophylactic Treatment of Eclampsia. (*Monatschr. fuer. Geb. und Gyn.*, Vol. 29,, p. 567.)

50. Thies: Hirudin Therapy in Eclampsia. (*Zeitschr. fuer Geb. und Gyn.*, Vol. 67, p. 479.)

51. Uthmoeller: Treatment of Eclampsia. (*Zentralbl. fuer Gyn.*, p. 1325, 1909.)

52. Vassale: Eclampsia and Insufficiency of the Parathyroid Glands. (Review in *Zentralbl. fuer Gyn.*, p. 1433, 1906.)

53. Ward: The Use of Chloroform in the Treatment of Eclampsia. (*Amer. Journ. Obstet.*, Vol. 61, p. 437.)

54. Zinke: Ninety Cases of Puerperal Eclampsia. (*Amer. Journ. Obstet.*, Vol. 63, p. 217.)

At present we are unable to define eclampsia in the customary manner as a disease characterized by a series of tonic and clonic convulsions. It cannot be doubted any longer that in rare instances the disease may exist and even end fatally without the typical convulsions. Coma was considered by Seitz (44) the one symptom that is constant, but Schmid (43) in a very extensive and thorough study of the problem proves that clinically the disease may appear and lead to death without convulsions and even without a state of coma. The post-mortem findings in such instances are identical with those established as characteristic for eclampsia by the investigations of pathologists like Schmorl, who claimed that eclampsia is a disease which can be diagnosed positively after death from definite histopathological changes in certain organs. Quite recently, however, Gussakow (14) points to the fact that these histological changes, especially in kidney and liver, may be absent in typical cases, and that identical conditions are occasionally found in cases of delirium tremens, epilepsy, chorea and other diseases characterized by convulsions.

The difficulty of diagnosis in cases without convulsions is apparent. In other instances the differential diagnosis will cause unusual embarassment. Randle* reports a ventricular hemorrhage during labor simulating eclampsia. A patient of Desnoues** died in the eclamptic state suddenly from a hemorrhage into the fourth ventricle. An unusual observation is recorded by De Snoo.† A patient developed convulsions during labor, which, though apparently eclamptic, were actually caused by a cerebral abscess.

Mistakes with hysteric and epileptic convulsions are too common to call for quotations from literature. The great importance of a correct diagnosis, on the other hand, is obvious if we will remember that the modern therapy of eclampsia includes such operations as Cesarean section and mamma amputation. It is this fact which induces the writer to include these references to diagnosis in a review chiefly devoted to a consideration of the treatment of eclampsia.

*Lancet, p. 1111, 1909.
**British Journ. of Obstet.. Vol. 16, p. 58.
†Zentralbl. fuer Gyn., p. 1631, 1909.

"If of late years," writes Zinke (54), "the mortality of eclampsia has been reduced at all, it is the direct result of careful prophylaxis and intelligent medical care." There undoubtedly lies a good deal of truth in this statement. Pregnant women to-day are more vigilantly watched and more often subjected to appropriate hygienic, dietetic and medicinal treatment when the very first signs of a toxemia appear. Systematic chemcial and microscopic examination of the urine has become the routine practice. In Skeel's (48) opinion the most important symptoms of a pre-eclamptic toxemia are the following: The presence in the urine of a large quantity of albumin, especially if it is increasing at the same time that the total secretion during twenty-four hours is diminishing; a blood-pressure stationary in excess of 150 mm. of Hg.; a leucocyte count increased 50 per cent. or more above normal; and demonstrable ocular disturbances. He emphasizes that a careful study of the entire symptom-complex, day by day, is essential, and will prove of greater value than investigations, however complete, in one direction only. Taking 470 grm. of urea as the normal output *per diem,* Reddy (38) finds that a very large number of pregnant women excrete far less than this. With appropriate diet the urea output may be increased; and, by treating in this manner the patients waiting in the Women's Hospital of Montreal, it is his belief that eclampsia has been abolished in that institution. Cauwenberghe (4) is convinced that failure of the digestive organs to act properly, as shown by the nausea, vomiting and various intestinal symptoms, instead of being the result of toxemia, indeed is the cause of the development of the toxins responsible for eclampsia. This theory does not seem very plausible, because he does not even attempt a better explanation of digestive disturbances of pregnancy, and also does not answer the very obvious and pertinent question, Why do disturbances of an identical nature not cause convulsions in non-pregnant women, or in men? But, if this author bases on his theory the demand for watchful supervision of the diet of pregnant women, we shall be ready to accept at least this part of his teachings. A probable relation between weather or climate and eclampsia has been claimed by various writers. Roth (39) thinks that the effect of the weather can be explained by its influence on skin function, also by the unfavorable influence of damp weather on renal lesions. He concludes that for prophylactic reasons, therefore, the pregnant woman must be directed to wear proper clothing, avoid drafts and sudden cooling, wet feet, and keep the skin active.

Accepting McCallam's theory that tetany is due to a deficiency of calcium salts, Mitchell (30) compares eclampsia with tetany. He comes to the conclusion that in eclampsia such a calcium deficiency is more pronounced, and advises in mild cases of pregnancy toxemia, calcium lactate, 10 gr., six times a day by mouth; for grave cases 30 gr. introduced either by means of the stomach or rectal tube, or, if necessary, given intravenously. A similar theory is developed by Drennan (6). The toxins leading to eclampsia are the products of an imperfect protein digestion which is caused by a disturbed liver function. The disturbance in the liver function is due to a fatty infiltration which is brought about by an increased abstraction of calcium salts from the mother by the fetus. The successful preventative treatment of even grave forms of toxemia, according to this writer, consists in a liberal calcium diet with lessening of the protein food.

One can only agree with Moran (32) who says that, however divergent

the views regarding the curative treatment of eclampsia may be, there exists universal accord concerning the necessity and efficacy of a prophylactic treatment of pregnancy toxemia, comprising general hygienic, dietetic and medicinal measures.

The views concerning the curative treatment of eclampsia indeed are divergent. We need only think of morphine, probably the first drug administered in almost every case of eclampsia. It is pronounced extremely dangerous by some recent writers. Morphine, Moran declares, is not antagonistic to eclampsia, but, on the contrary, its effect is added to that of the poison already in the system. Nevertheless morphine still plays the most important rôle in any expectative treatment of this disease, which is best represented in the Stroganoff method to be described later on. The other narcotic, until recently generally recommended and employed, is chloroform. Experiments first made by Howland and Richards, since repeated by many others, prove that a prolonged narcosis, but especially a repeated administration of chloroform, which is more destructive than a single one, leads to definite changes in the liver that are practically identical with those found in the liver of women who have died from serious forms of toxemia during pregnancy. This knowledge has induced most obstetricians to substitute ether for chloroform in all cases of pregnancy toxemia and especially in eclampsia. In dealing with this question in a recent article, Ward (53) acknowledges that objections have been made against the use of ether in those cases which seem of the renal type. It is claimed that ether proves more irritating to the kidneys than chloroform. Experiments, in his opinion, have shown that this assumption certainly is not correct for all cases. On the other hand, Cragin and Hull (5) have demonstrated that in animals ether produces no marked effect on liver or kidney even when anesthesia is continued through three successive hours. Thus the advantage still would seem to lie distinctly in favor of ether. Cragin and Hull also state that according to their observation the maternal mortality of eclampsia has become smaller since they have adopted ether as the general anesthetic.

If we accept the view, now generally held, that a simple reflectoric type of eclampsia does not exist, then we must admit that morphine, chloral hydrate and chloroform or ether, excluding the use of the latter for the purpose of operation, are employed as symptomatic and not as curative remedies, i. e., in an attempt to suppress convulsions. The mere suppression of this one symptom of the disease without an effort to remove the underlying cause has been regarded by many writers as a rather useless procedure. Seitz (44), however, shows that, similar to what occurs in epilepsy, the mental disturbances subsequent to eclampsia are evidently directly related to the frequency of convulsions, or in other words, the convulsions themselves, and not the toxemia, are responsible for the disturbances in the brain. In the light of this fact efforts to suppress convulsions would seem not only justifiable but highly desirable.

Veratrum viride, nitroglycerine and venesection are resorted to for the purpose of reducing the abnormally high blood-pressure of the eclamptic woman. While hardly ever mentioned in European, especially German, literature, veratrum viride finds many enthusiastic advocates in this country. Zinke asserts that this drug given in sufficiently large doses is the remedy *par excellence* to reduce the blood-pressure and pulse-rate. In the Sloane Maternity Hospital of New York better results have been obtained in substituting veratrum, nitroglycerine and chloral hydrate for venesection. Mangiagalli (25) recommends repeated small

doses, given hypodermically, until the pulse is soft and its rate reduced to 80. He considers the drug contraindicated in the presence of a small fast pulse. The drug has no curative value and should be used solely for the purpose of gaining time for spontaneous or artificial delivery. Mirto (29) used the "Mangiagalli method" with good results in 61 cases. He administers the tincture either internally, 20 to 60 drops in two or three doses, or $\frac{1}{2}$ to 1 c.cm. subcutaneously. But again in this country Moran (32) asserts that the dangers of veratrum more than offset its advantages. Worthy of serious consideration in this connection are observations made by Bailey (2). He finds that rapid emptying of the uterus frequently produces a drop in blood-pressure amounting to 100 mm. of Hg., causing a condition of collapse or shock. Veratrum viride given to its full physiological effect may cause a sudden fall of blood-pressure amounting to 145 mm. Hg., also producing shock. The administration of this drug combined with emptying of the uterus may result in such profound shock that the patient cannot recover from it. If it should seem advisable to resort to a drug to lower the tension, in Bailey's opinion nitroglycerine or erythrol tetranitrate should be used, because they act on the peripheral vessels and not on the medullary centres. McCarthy (24) also considers nitroglycerine the most effective drug for this purpose.

The effect of venesection is twofold—it produces an immediate decrease in the abnormally high blood-pressure and permits the speedy elimination of a large amount of toxic material from the circulation. A number of recent writers plead for very copious bleedings. Boissard (3) removed in one case 900 c.cm., and feels that the proper treatment of eclampsia consists in a large bleeding followed by rapid delivery. Similar views have been expressed by Little (23). Uthmoeller (51) withdraws from 800 to 1,250 c.cm. of blood. He finds three explanations for the curative effect of a large venesection: (1) A very large quantity of eclamptic poisons is removed with a large quantity of blood; (2) the high blood-pressure is effectually reduced and circulatory conditions improved; (3) the whole body is weakened to such an extent that it is less able to react in the form of a convulsion to an irritation. From a careful study of a large number of cases, Lichtenstein (22) comes to the conclusion that women, in whom convulsions stopped immediately after delivery, had lost about double the amount of blood as compared with those in whom convulsions continued, and about four times the amount as compared with those in whom the first convulsion appeared after delivery. Therefore, the good results of early and quick delivery in all probability are not due so much to the actual emptying of the uterus as to the loss of blood incident to these more or less severe surgical procedures.

It has been the common practice to substitute at once saline solution for the blood withdrawn by means of venesection. Indeed one author, while taking the blood from the distal end of the severed vein, simultaneously injects saline solution into its proximal end. As the result of interesting researches in the chloride metabolism, saline solution lately has suffered severely in its reputation of being the sovereign remedy in the treatment of eclampsia. Experiments made on animals convinced Kawasoye (21) that the inflamed kidney does not sufficiently eliminate the chlorides. As the result of this pathological increase of the chlorides in the blood, edemas rapidly develop if large quantities of saline solution are introduced. He was induced to start these investigations by the

following experience: Copious infusions of saline solution were given subcutaneously to two pregnant women exhibiting the typical symptoms of a kidney in pregnancy. In both the edema increased rapidly, while the diuresis was diminishing. Both patients died. Javal (19) found the blood-serum hypertonic during the crisis in 9 out of a total of 10 cases of eclampsia, while after the crisis the chlorides again diminished. The results of Kawasoye's investigations have been confirmed by Sippel (47). In his opinion it will be necessary in future to give eclamptic patients large quantities of fluid either per rectum or by the mouth, using the stomach-tube in comatose patients. These fluids should contain a very small amount of salt. The lower the osmotic pressure of these fluids, the more likely they will reduce the molecular concentration of the chloride contents of the blood, and the less irritating will be their effect on the diseased renal tissue during elimination. Jacobson (18) still holds to the hardly defensible view that in cases of eclampsia we are dealing with uremia due to a nephritis, and that pregnancy, labor and the puerperium are simply coincidents which also may exert some deleterious influence. He believes that uremia or eclampsia is caused by the retention in the blood of salts, principally of sodium chloride. The molecular concentration and specific gravity of the blood are raised. Improvement must be dependent on the reduction of this abnormal concentration. This, he thinks, can be accomplished in two ways: (1) By starving the patient; (2) by diluting her blood through the addition of water. He withholds food for three days, and administers water by means of the rectal drop. Plain water irritates the bowel. Saline solution cannot be used because the patient's blood already is retaining an abnormal amount of salt. He therefore decided to use a sugar solution. He claims to have actually ascertained the resulting reduction of molecular concentration of the blood, and to have obtained good results in 2 cases of eclampsia in which he had tried his new method.

The main purpose of the introduction of large quantities of fluid is the propagation of elimination of toxins, chiefly through the kidneys. A scant diuresis or anuria continuing after delivery is generally regarded one of the most unfavorable symptoms. As a last resort in such desperate cases, renal decapsulation has been performed, apparently with some success. The value of this operation lies in its assumed prompt diuretic effect. In connection with some experimental work, the writer recently studied the literature dealing with the rationale and the results of this operation when performed in cases of serious eclampsia. His conclusions (7) are as follows: There is no acceptable explanation of the supposed immediate effect of this operation extant; and convincing or even satisfactory proof for the beneficial effect of decapsulation is wanting. Thus we seem to be forced to the disappointing conclusion that in the present state of our knowledge any belief, as to the value of renal decapsulation in desperate cases of eclampsia, actually is based alone on the positive assurance of certain authors that they have seen patients recovering after this operation, who in their belief would have died without it.

We may next consider certain new methods of treatment which are based on some new theories concerning the etiology of eclampsia.

Vassale (52) based his theory of the etiological relation of eclampsia to an insufficient function of the parathyroid gland, on the following three facts: (1) Pathological changes in, or total absence of, one or both parathyroid glands found in patients who died from eclampsia; (2)

good effect of parathyroid extract in the treatment of eclampsia; (3) experiments made on pregnant animals show that a latent parathyroid insufficiency during the last third of pregnancy regularly leads to severe convulsions. In some of these animals convulsions were stopped by the administration of parathyroid extract. The author emphasizes the known fact that muscular exertion and nervous exhaustion produces parathyroid insufficiency. This could explain the prevalence of eclampsia among primiparæ. So far reports of good results are scarce. Kaiser (20) and Quadri (37) each describe one favorable case. On the other hand, such an etiological relation is denied by Frommer (13) and Seitz (45), the former basing his opinion on an experimental study, the latter both on experiments and negative results in the treatment of eclampsia.

A form of serum treatment has been introduced by Mayer (27). He thinks that a pregnant woman, offering the symptoms of a pregnancy toxicosis, is presumably lacking in her blood in those antitoxic substances, which undoubtedly must be present in the blood of the normal healthy pregnant woman. On this consideration he bases his suggestion of injecting intravenously blood-serum of normal pregnant women. His first case was a toxic dermatosis of pregnancy which seemed to be greatly benefited by the treatment. Analyzing an unsatisfactory attempt with this method recorded by Ruebsamen (41), Mayer in another paper (28) once more emphasizes the fact that results can be expected only if the disease treated in this manner is actually the direct result of a pregnancy toxicosis. In this latter paper he describes three new satisfactory experiments. One was made on a patient suffering from a serious type of eclampsia. Three intravenous injections of 20 c.cm. each of normal pregnancy serum were given without any other form of treatment. The convulsions in this case ceased several hours before the spontaneous birth of the child occurred. Freund (11), who first had employed horse-serum, later obtained similar good results by using the serum of normal pregnant women. In eclampsia he still adheres to prompt delivery as the first step of any therapy, but injects serum if after delivery the renal elimination of chlorides continues insufficient, or in those rarer cases in which, without an edema, the toxic symptoms continue in grave form in spite of good chloride elimination.

The hirudin treatment of eclampsia, now often mentioned in literature, was first suggested in 1897 by Volhard, but only recently placed on a scientific basis by Engelmann and Stade (8-9). They had confirmed the theory of Mathes (26) that the poisonous, harmful element contained in the juice expressed from placentas must be a substance which increases the coagulability of the blood, thus favoring the development of thrombi so typically found in serious cases of eclampsia. They concluded that such an effect could possibly be counteracted by the introduction into the maternal blood of some substance which would lower the pathologically increased coagulability of the blood. Hirudin, an extract obtained from leeches, has such properties, and experimentally used by them on animals seemed to confirm their theory. They used hirudin in eclampsia, and Engelmann (10) gives a report of the results obtained in 14 cases. In 12 of them, in his opinion, the effect on the convulsions was evident. On the other hand, Thies (50) records his unsatisfactory experience in 2 cases, and warns against too large doses which may prove disastrous.

The theory of a mammary origin of eclampsia is comparatively old. In cows a collapse or paralysis is commonly observed after labor, which often has been pronounced as identical with eclampsia in woman. The

histological findings at least are very similar. In 1898 Schmidt suggested that the toxic substances are formed in the udder, and attempted to prevent the disease by retarding milk secretion. He injected a one per cent. solution of sodium iodide into the milk-ducts and, according to Santi (42), actually succeeded in reducing the mortality of this disease from 50 to 10 per cent. Still better results were obtained by injection of air into the milk-ducts, preceding the iodide solution. Santi states that at present this treatment is successfully used broadcast by the farmers. Persson (33) modifies such a mammary theory in the following way: The blood contains certain substances, which at the time of birth are transferred to the breast to furnish nutriment for the born child. While the breasts are not functionating, a retention of these substances may lead to that intoxication which causes eclamptic seizures. He, therefore, attempts to stimulate mammary function by producing an active hyperemisation with large Bier's cups. Sellheim (46), not quoting any authorities, develops a new theory and a new treatment, which may rightly be regarded as a combination of the two just mentioned. In his opinion none of the placental theories is satisfactory, and a mammary theory would seem more acceptable. He is convinced of the correctness of his theory, because he obtained good results in the treatment of 2 cases of eclampsia; in one, by injecting potassium iodide in saline solution into the breast, and, in the other, by actually removing both breast glands. Though this latter therapeutic procedure hardly could be called either plausible or appealing, it has already been adopted by Herrenschneider (15). His case seems worthy of a more detailed mention. The patient had a severe eclampsia and was delivered by means of an abdominal Cesarean section. The convulsions continued, therefore he amputated both breasts next morning. Coma continued for the next forty-eight hours. Patient next developed a pneumonia on right side and became maniacal. Signs of pulmonary infiltration also appeared on the left side. On the ninth day after operation, during a severe coughing spell, the abdominal wound ruptured and a large amount of small intestines was found protruding. The wound was resutured. Next a pulmonary abscess developed on the right side, finally followed by a slow recovery. The author finds the convincing proof of the good effect of breast amputation in the following observation: On admission the patient's blood-pressure was 160 mm. Hg. It rose to 170. Shortly before amputation of the breasts it was found between 180 and 190. Twenty minutes after the operation it sank to between 110 and 115, and then gradually rose to 130-135, but never above this figure.

The scope of this review forces the writer to refer only to those theories of the origin of eclampsia, which have directly led to the introduction of new methods of treatment. Innumerable other theories are extant.* All those which deserve consideration accept the one fact, viz., that the disease is caused by some toxic substance which forms under the influence of an existing pregnancy. That the interruption of pregnancy, therefore, can be the only logical curative treatment of eclampsia, apparently would be the incontrovertible deduction drawn from this fact. The elimination of the source of the toxins, by means of a more or less forcible delivery to-day, is practically included in every mode of therapy suggested and practised. Those holding most radical views plead for the immediate delivery after the first convulsion. The majority of authorities, however, still seem to be in favor of a preliminary attempt with

*Vide INTERSTATE MEDICAL JOURNAL, p. 149, February, 1912.

medicinal treatment. The number of those, who believe that a conservative, non-operative treatment will prove sufficient in almost all cases, is very limited.

A strictly expectative treatment of eclampsia at the present time is defended probably only by Stroganoff and a few authors who have used this method, which in literature is well known as the "Stroganoff method." Its main features may be described as follows: Any sort of irritation, which may start a convulsion, is carefully avoided. The patient is kept quiet in a darkened room, and is protected against loud noises or disturbances of any kind. Under superficial chloroform anesthesia the patient is cleaned and examined. Whenever the patient has to be handled during examinations, catheterization, application of hypodermics, etc., the patient is anesthetized, approximately 20 drops of chloroform proving sufficient for the purpose. Drugs are given systematically: 0.01 grm. of morphine hypodermically at once, one hour later 2 grm. of chloral hydrate per rectum either in milk or in saline solution, two hours later the same dose of morphine, four hours later the same dose of chloral hydrate, six hours later $1\frac{1}{2}$ grm. of chloral hydrate, this medication to be continued if necessary. Labor in the meantime either occurs spontaneously, or is hastened by the application of the forceps if the cervix has dilated sufficiently. Forcible deliveries should be resorted to only in extreme cases. Stroganoff, who initiated this treatment twelve years ago, in his last report (49) gives the results obtained in 330 cases. The maternal mortality is a little less than 7 per cent., but he adds that the results should be better and would be materially improved if the proper treatment in every case would be instituted immediately after the first manifestation of the disease had been noticed. He closes this very noteworthy paper with the remark: "It is my belief that the often used vaginal Cesarean section, nephrotomy or renal decapsulation, or especially the combination of both, indicates a sort of surgical mania." Of the 50 cases treated by the Stroganoff method in Leopold's clinic and reported by Roth (40), in not one instance was forcible delivery employed. 46 of the patients recovered. In Roth's opinion this must be considered an eminently satisfactory result, since in the same clinic the maternal mortality was 19 per cent. when the more active therapy including vaginal Cesarean section and all forms of accouchement forcé were resorted to. But the conservative treatment also proved superior as regards the fetal mortality. Roth sees the main advantage of the Stroganoff method in the fact that it can be used by every physician, since it is strictly medical and not surgical, and this, he adds, probably explains why it has not become as popular as it deserves to be in the present surgical area of obstetrics. Primo (36) while readily acknowledging the great advantages of the method, from a study of his own 83 cases concludes that, in the very serious cases, operative interference seems to give about the same results as far as the mothers are concerned, but better results as regards the children.

The general trend in modern literature undoubtedly is towards early interference, and articles like those of Hirst (16) or Zinke, pleading in favor of greater conservatism, are only rarely met with. "Any form of forced delivery," Hirst states, "adds to the risks and increases mortality." Moehlmann (31) tries to prove that in some cases immediate delivery is not absolutely necessary, and that better results are obtained by waiting for more favorable conditions for artificial delivery. Albeck (1), who gives a detailed report of 161 cases of eclampsia treated in the Maternity

Hospital of Copenhagen, qualifies this view by stating that one may dare to delay delivery if one feels able to recognize a case as being surely of a non-serious character. From his own cases, he concludes that the prognosis, both for mother, and child, is the worse the later after the first convulsion the delivery occurs or is effected. Seitz emphasizes the important fact that when we speak of the results of forced delivery and compare them with the results of conservative treatment, we should differentiate between forced delivery, executed after some attempt with medicinal measures, and immediate forced delivery after the first convulsion. There can be no doubt, in his belief, that the best results were obtained with the early forced delivery; and he agrees with Bumm that a radical mode of dealing with eclampsia should have a maternal mortality not over 5 per cent. Cragin and Hull (5) state that in the Sloane Maternity Hospital the mortality was so high, under the former palliative plan of treatment, that during the last ten years it has become the rule to empty the uterus after the first convulsion. According to Fromme (12), the results of immediate delivery are so strikingly good that nobody seems to have a right to advise even a preliminary expectative treatment. In a discussion, following the reading of this paper before one of the German Gynecological Associations, we find well-known gynecologists like Henkel, Veit, Krukenberg, and others endorsing Fromme. Thorn also agrees with the essayist, but feels that further investigations of a conservative therapy will be called for, if we find men like Stroganoff or Leopold amongst its enthusiastic advocates. Another very important point, quite recently brought up in the discussion of this problem of extreme radicalism, has already been mentioned. Lichtenstein found that the favorable results with early and forcible delivery are probably not due to the actual emptying of the uterus but to the loss of blood incident to the operations.

Reviewing, as the last part of this paper, the various methods of forced delivery advocated by the various writers, we find to-day as the main topic of discussion the special suitability of vaginal Cesarean section in dealing with eclampsia. As opinion gradually grew in favor of earlier interference, the slower methods of dilatation of the cervix, such as packing, digital divulsion, colpeurysis, etc., were gradually replaced by quicker methods such as the Bossi dilator and cervical incisions, the latter finally leading to vaginal Cesarean section. This operation to-day in its perfected technique has become a standard procedure which proves equal, if not superior, to the classical abdominal Cesarean section, at least in the treatment of eclampsia. Among recent advocates of vaginal hysterotomy we find Humpstone (17), and especially Reuben Peterson (34-35) who bases his conclusions on a painstaking analysis of 530 cases collected from literature. His opinion at the present day must be considered the most authoritative extant. It reads as follows: No time should be wasted in medicinal treatment after the first convulsion has occurred. The uterus should be emptied at once by the operation which gives the best results for mother and child. Vaginal Cesarean section meets these requirements. When the cervix is closed it is the ideal operation, eventually it will supersede every other form of divulsion method. It should be used in all cases except where the cervix is dilated sufficiently to allow a rapid completion of dilatation manually. Abdominal Cesarean section, while apparently preferable in the interest of the child, has too high a maternal mortality, and, therefore, should be limited to cases complicated by a narrow pelvis, or if for other reasons delivery through the natural passages is impossible.

This opinion of Peterson must be qualified in just one respect—namely, it is the ideal hospital treatment for eclampsia, if we are unwilling to accept the teaching of a few German writers that vaginal Cesarean section can be done without difficulty and with equal success in private homes. Certainly not in the sort of private homes in which the overwhelming majority of obstetrical work is done by the American practitioner of medicine.

It is always embarrassing to acknowledge the true fact, rarely stated openly and only occasionally denied, that there must of necessity be various methods of dealing with certain diseases, methods for the rich, methods for the poor, methods for the people who living in larger cities can enjoy the advantage of hospital facilities, and methods for those, rich and poor, who live in small cities without any accessible hospital accommodation in case of emergency. A method, both valuable and general, of dealing with eclampsia should take into consideration the needs of this last—probably the largest group of patients. The writer may be permitted to give in conclusion his views concerning such a form of therapy, compatible with the results of the latest investigations and teachings.

All pregnant women should be watched carefully and familiarized with the principles of a proper hygiene and diet during gestation. Medical treatment is begun as soon as some symptom of toxemia manifests itself. If symptoms become aggravated, in spite of treatment, the patient probably is best transferred to a hospital, and, if near the normal end of pregnancy, labor is started artificially as soon as the first threatening symptoms appear.

Every patient should be delivered as quickly as possible after the first convulsion. The best methods of quick delivery can safely be performed only in well-equipped hospitals. Vaginal Cesarean section is the most suitable method in cases in which the cervix is but slightly dilated or closed. Therefore, a patient seized by an eclamptic convulsion should immediately be brought into a hospital, whenever this is possible.

If the patient after the first convulsion cannot quickly reach a hospital, conservative, medicinal treatment is begun at once as a preliminary measure. It will consist chiefly in the administration of morphine, chloral hydrate and nitroglycerine, and in the stimulation of elimination through skin, kidneys, and intestinal tract.

For the patients who are excluded from the undeniable advantage of hospital accommodation, a treatment along the lines of the Stroganoff method undoubtedly will prove most satisfactory. Ether, however, will have to take the place of chloroform in this as in all procedures calling for a general anesthesia in eclampsia. A copious bleeding by means of venesection will be advantageous. The intravenous or subcutaneous administration of saline solution in the present state of our knowledge would not seem advisable. Veratrum viride can be used only in those cases in which the possible necessity of a forced delivery is not apparent. Even under such a palliative medicinal treatment labor must be hastened, and the patient delivered by means of forceps or version, whenever the cervix is dilated enough to permit of easy complete divulsion manually.

HISTOPATHOLOGY OF THE THYMUS.

By ALFRED FRIEDLANDER, M. D., of the Editorial Staff.

1. Barbarossa: Histology of the Thymus Gland. (*La Pediatria*, June, 1911.)
2. Low: Blood Formation in the Thymus. (*Wien. klin. Wochenschr.*, Vol. 24, p. 418, 1911.)
3. Weill: Functions of the Thymus. (*Lyon Méd.*, November, 1910.)
4. Perrier: Histological Modifications of Hypophysis and Spleen after Thymectomy. (*Rev. Méd. de la Suisse Rom.*, October 20th, 1910.)
5. Klose: The Thymus Gland. (*Archiv fuer Kinderheilk.*, Vol. 55, 1911.)
6. Basch and Rohn: The Physical Evidence of the Thymus. (*Trans. Amer. Journ. Dis. of Children*, February, 1912.)
7. Veau: Hypertrophy of the Thymus. (*Bulletin de la Soc. de Péd. de Paris*, p. 161, 1911.)
8. Ferrand and Chatelin: The Value of the X-Ray in the Diagnosis of Enlarged Thymus. (*Bulletin de la Soc. de Péd. de Paris*, p. 164, 1911.)
9. Oelsnitz: Latent Hypertrophy of the Thymus. (*Annales de Méd. et Chir. Inf.*, February 1st, 1912.)
10. Ssokolow: Thymic Asthma and Thymic Death in Children. (*Archiv fuer Kinderheilk.*, Vol. 57, December, 1911.)
11. Vacher: Hypertrophy of the Thymus and Congenital Syphilis. (*Thèse de Paris*, 1911.)
12. Friedlander: Involution of the Thymus by the X-Ray. (*Archives of Ped.*, October, 1911.)
13. Régaud and Crémieu: Involution of the Thymus by the X-Ray. (*Lyon Méd.*, January 1st, 1912.)
14. Leitao: Enlarged Thymus Treated by X-Ray. (*Archiv. Brasil de Méd.*, Vol. I, p. 572, 1911.)

The questions of histology, functions, and pathology of the thymus continue to engage the attention of a host of investigators. In the JOURNAL for March, 1911, the author contributed a review of the literature, and it seems worth while to summarize again, at this time, existing views.

From a careful histological study, Barbarossa concludes that in man the thymus does not disappear at the age of fourteen as generally supposed. It is a gland with an internal secretion of undefined nature, exercised chiefly in intra-uterine life. This function is due principally to the Hassall corpuscles which are of two kinds, one appertaining to evolution, the other to involution of the gland. The corpuscles of the first order are epithelial in origin, those formed in the stage of involution

probably have their origin in great measure in the proliferating endothelium of the vessels; thus in the stage of involution there is a great scarcity of blood-vessels while the Hassall corpuscles tend to enlarge.

Low studied 57 thymi, and came to the conclusion that in extra-uterine life the thymus is not of great importance as a blood-forming organ. Myelocytes are never numerous and nucleated reds are not present in the thymus.

Discussing the *function* of the thymus, Weill shows that it is an organ composed of lymphoid and glandular tissue, with a true balance between the lymphoid and epithelial structures. It is not indispensable to life, because after a certain period it naturally disappears, though from the first month of intra-uterine life to the end of the fourth year it has a most important action on the system. Later on its functions are easily replaced by the action of the genital organs, suprarenals, thyroid, hypophysis, and spleen. To determine the question of the replacement of function of the thymus, Perrier removed the thymi of a number of rabbits. He found that the hypophysis in such animals underwent a marked change, notably showing a great increase in the number of chromophilic cells. The spleen showed an increase of the recticulum and hyperplasia of the lymphatic tissue, indicating a vicarious functional activity.

The experiments of Klose (alluded to in the last abstract on this subject, INTERSTATE MEDICAL JOURNAL, March, 1911) have shown that the thymus is a vital organ which may not be completely removed during the period of its functional activity without great danger to the development of the organism. After complete thymectomy (in the human being as well as in the lower animals), there are produced grave symptoms of acid intoxication, probably nucleinic-acid poisoning and diminution of the calcium salts. Later on, as has been shown by experiment, if the child or animal survive, there occur grave changes in the osseous and central nervous systems.

Clinical Pathology.—For years the literature has been filled with discussions as to whether the diagnosis of enlarged thymus can be made *intra vitam*. There does not seem to be any question any more as to the possibility of mapping out not only an enlarged thymus, but even a normal thymus in early life. Indeed, as far back as 1900, Blumenreich made an exhaustive study of the subject and showed conclusively that careful percussion alone would enable one to map out the thymus in the vast majority of cases. Basch and Rohn have recently undertaken a similar study. They find that, by combining an exact percussion of the mediastinal area (done by a specially devised percussion instrument) with auscultatory percussion and friction of this region, it is possible to obtain a more exact estimate of the size and condition of the thymus than has hitherto been the rule. Systematic examination of 140 children shows that the size of the thymus varies according to the age of the child, its nutritive condition, and to certain pathological conditions.

Normally the area of thymus dullness in children shows a rhomboid form which extends from the jugulum down to the second or third rib, and whose lateral margins are confined to the sternal and parasternal lines. By exact drawings of the clinical findings on a diagram of the anterior thorax they can be correctly compared with the autopsy results.

The value of the *x*-ray as an aid to diagnosis of the size of the thymus is now recognized, and the original claims of Hochsinger in this connection have been abundantly verified. Among recent investigators, Veau, and Ferrand and Chatelin have made confirmatory studies. With refer-

ence to the supposed confusion in the picture caused by enlarged bronchial glands, the latter authors found that the enlarged thymus gives a shadow continuous with the heart shadow and generally in the median line with rather sharp outlines. Bronchial glands give extramedial shadows which are separated from that of the heart. The shadow is *not* continuous with the heart shadow. Oelsnitz is convinced also of the value of the *x*-ray in the diagnosis of *formes frustes* of status lymphaticus or of simple hypertrophy where the classical symptoms of the condition are not present.

Ssokolow has analyzed 101 cases of death from enlarged thymus. He does not believe that mechanical pressure of the enlarged gland is the actual cause of death in many cases, holding rather that we have an intoxication of the body due to excessive internal secretion (Svehla's hyperthymization). His findings in general correspond with those usually accepted, but the article contains an interesting critical analysis of the recorded cases. As a result of his experimental work on the thymus, the author concludes that the gland is of essential importance for the growing child. Its internal secretions are necessary for normal growth, but its functions can at least partially be assumed by other organs if necessary.

Vacher describes 2 cases of hypertrophy of the thymus, with sudden death in each case. Both these children showed distinct evidence of congenital syphilis. The author is of the opinion that, in a great number of cases of enlarged thymus, congenital syphilis is an important etiological factor. (This view is not generally held. ED.)

Therapy.—The therapy of cases of status lymphaticus and enlargement of the thymus is under very active discussion at the present time, now that the diagnosis is definitely possible in so many cases. It is admitted that internal medication is of absolutely no avail. The results, that followed surgical intervention in the form of partial or complete thymectomies, have led to the hope that the solution of the problem might be found here. But the operation is an exceedingly dangerous one with a high mortality, though it has been performed a number of times with complete relief of the pressure symptoms. Again, later researches have shown that complete removal of the thymus during the period of its functional activity has been followed by marked changes in the central nervous and osseous systems, with later death under circumstances leaving no room for doubt as to the rôle of the thymectomy in its production.

The striking results of the *x*-ray used therapeutically in these cases lead to the belief that in this agent we possess a therapeutic measure of the greatest value in cases of enlarged thymus.

In 1907 the author of this review reported a case successfully treated by the *x*-ray. Since this time several others have been reported, four from Cincinnati. It is noteworthy that although only the region of the thymus is exposed to the *x*-ray, the effects of the treatment are manifest in spleen and lymph glands as well.

An experimental study of involution of the thymus by the *x*-ray (in rabbits) was therefore instituted, the findings being controlled by histological examinations. As a result of this study the author was led to the following conclusions:—

In the *x*-ray we have an agent which is at the same time safe and efficacious in the treatment of enlarged thymus and status lymphaticus.

By means of the *x*-ray it is possible to induce not only an involution

of the thymus, but also in cases of status lymphaticus to reduce the size of the spleen, of the lymph nodes, and to change the lymphocytic blood-picture to a normal one.

By variation of the number and frequency of x-ray exposures, it is possible to bring about the involution with varying degrees of rapidity. Where the symptoms of thymic asthma are urgent, the exposures can be given on successive days, thus inducing prompt results.

Experimentally it has been shown to be possible to induce any degree of fibrosis of the thymus from the very slightest to absolutely complete sclerosis. (Régaud and Crémieu have just reported their experiments in 40 young cats, showing that the thymus definitely disappeared after exposure to a strong dose of the Roentgen ray.) Clinically, therefore, the dosage of the x-ray can be regulated according to the necessities of the case.

A thymus partially involuted by the x-ray is capable of regeneration. The danger of loss of thymus function (as in the case of complete thymectomy) is thus obviated, and the metabolic changes after thymectomy averted.

The use of the x-ray in these cases is without danger to the individuals as proved by the subsequent normal development of the treated cases.

Leitao has recently reported a case of enlarged thymus successfully involuted by x-ray exposures. He concludes that the x-rays have a most satisfactory action in cases of enlarged thymus, and, except in cases of imminent death from suffocation, should always be preferred to surgical intervention.

ENTEROPTOSIS AND THE ENTEROPTOTIC HABITUS.

A REVIEW OF RECENT LITERATURE.

By Jesse S. Myer, M. D., and Jerome E. Cook, M. D.

1. Smith: Enteroptosis with Special Reference to the Etiology and Development. (*Journ. Amer. Med. Assoc.*, November 26th, 1910.)
2. Ochsner: Surgical Aspects of Enteroptosis. (*Ibid.*)
3. Butler: Enteroptosis in Children. (*Journ. Amer. Med. Assoc.*, December 31st, 1911.)
4. Beyea: Elevation of the Stomach in Gastroptosis by Suture of the Gastrohepatic Omentum. (*Journ. Amer. Med. Assoc.*, March 5th, 1910.)
5. Eve: The Surgical Treatment of Gastroptosis. (*British Med. Journ.*, May 7th, 1910.)
6. Hutchinson: The Principles of Treatment in Gastroptosis. (*Ibid.*)
7. Bœnninger: Gastroptosis and Its Causes. (*Berl. klin. Wochenschr.*, March 10th, 1910.)
8. Goldthwaite and Brown: The Cause of Gastroptosis and Enteroptosis and Their Causative Relation to Rheumatoid Disease. (*Boston Med. and Surg. Journ.*, May 26th, 1910.)
9. Holzknecht: Recent Advances in the X-ray Examination of the Digestive Tract. (*Berl. klin. Wochenschr.*, January 23rd, 1911.)

Although it has been a number of years since Glénard and Stiller called attention to the enteroptotic habitus and its clinical significance, the importance of their observations has only quite recently come to be generally conceded. It is true that their views met with some accord from the first from those clinicians whose work led them to see many cases of gastro-intestinal disturbance, but outside this rather narrow circle the "enteroptotic habitus" was seldom mentioned. There was a symposium on this topic at the meeting of the American Medical Association in 1910, which did much to spread the knowledge already gained and to stimulate further investigation. But there remains much that is obscure as to the condition both in regard to its diagnosis and to its etiology and treatment.

If we accept the view that the enteroptotic habitus is a congenital and hereditary anomaly, we should be able to trace the defect to childhood and infancy; if, on the other hand, it can be shown that the condition is acquired through nutritional and other faults, prophylaxis may obviate its development. Bœnninger does not agree with the original views of Stiller that the condition is due to embryonal arrest, or is a stigma of degeneration, and neither Butler nor Bœnninger could demonstrate in the infant and child, up to the age of puberty, typical cases of the enteroptotic type comparable to those seen in the adult. Butler calls attention to the

fact that in the infant the liver is distinctly below the free margin of the ribs, the right kidney frequently, and the left occasionally, palpable. These findings gradually disappear and approach the adult type as the infant grows. In a healthy infant, the signs of an enteroptotic type are rarely seen. On the other hand, in infants suffering from malnutrition, we see conditions approaching such a type; but Butler has not been able to trace the enteroptosis of adults to infant malnutrition. Fully 50 per cent. of all children, according to Butler, have a movable tenth rib, usually sliding. The complete picture of the enteroptotic habitus is rarely seen in very young children, and, according to Bœnninger, not at all. At the approach and with the development of puberty a large percentage of females, variously estimated from 30 per cent. to 60 per cent.; and about 25 per cent. of males show the typical enteroptotic type, with low stomach, palpable liver, etc. The actual ptoses are then seen for the first time. Bœnninger believes that the habitus and the resulting ptosis can be much influenced by proper hygiene in the growing period. It will, therefore, be seen that the two classes of enteroptosis given—namely, the congenital and acquired, are unsatisfactory both from a practical standpoint, and from the fact that it has not been very well demonstrated thus far that the condition is a congenital one.

As to the diagnosis of the condition, it must be said that attempts to define a pathognomonic sign have met with little success. The condition may exist without the floating tenth rib, upon which Stiller lays so much stress, and without an abnormal "jugulo-pubic index" as defined by Becker and Lenhoff. It is the general make-up of the individual, rather than any one detail, which determines the enteroptotic type: the slender, frail, bony structure, thin musculature, long, narrow chest, more or less vertical lower ribs, narrow epigastric angle, and, perhaps, a floating tenth rib. The epigastrium is usually flat with occasionally a slight bulging below the navel. It is this unusual configuration of the trunk which causes the stomach to assume the vertical or "long stomach" type, which we know as the gastroptotic. We can, therefore, well appreciate the statement of Hutchinson that gastroptosis is not in itself a disease, and needs no treatment. Only when it is associated with functional disorders of the stomach and intestines, or with neurasthenia, does it call for attention.

The disorders of stomach functions met with in this condition are usually due to the accompanying neurotic condition rather than to the mere fact of the displacement. The treatment, according to Hutchinson, resolves itself (1) into the treatment of the neurasthenia, (2) the correction of the functional disorders, and (3) of least importance, the correction of the malposition, if possible. The low position of the stomach is in most cases not due to an atonic condition of that organ. This can be determined with a bismuth capsule. When given on an empty stomach, the curvature seems to be just as low as when the stomach is full. In short, stomachs are not as stretchable, either when they are so-called ptotic or when in normal position, as has been supposed. Moreover, the symptoms associated with enteroptotic habitus may be entirely cured without raising the stomach in the least, and their severity is in direct proportion to the severity of the neurotic symptoms rather than to the degree of ptosis.

The treatment which the internist has followed, and according to Hutchinson should continue to follow, must be aimed at the atonic condition of the entire individual, that is to the treatment of his neurotic

symptoms. The patient must be treated, and not his stomach. Rest in bed, plenty of well-chosen food, massage, exercise, etc., in fact, even a strict or modified Weir Mitchell cure is indicated in such cases, with an after-cure free from over-strain, either mental or physical, and a diet of maximum nutrition with a minimum of bulk. A belt may be worn until abdominal exercise and massage have increased the tone of the abdominal muscles. Hutchinson gives three very emphatic "dont's" for the handling of the condition: (1) Don't starve or "diet" the patient; (2) don't lavage the stomach; (3) don't operate, because neurasthenics are not advisable subjects for operation. It appears, however, that the surgeons are not inclined to pay much attention to the last "don't," and, according to their statements, fortunately for the patient.

To the surgeon, at least, the displacement of the stomach seems to be a matter of prime importance. They attribute to the malposition a kinking or angulation of the first part of the duodenum, which interferes with the proper emptying of the stomach and causes pain. Eve describes 8 cases of hematemesis in which no ulcer was to be found on abdominal section. He attributes the bleeding in these cases to the low stomach which, by impeding the venous return, causes the dilatation of the stomach mucosa venules. It is the virginal or congenital type of gastroptosis that causes the most trouble, and needs surgical intervention, according to Eve, though the acquired type may sometimes call for the surgeon's aid. As to the operation itself, the tendency now is away from the former procedure of gastro-jejunostomy and towards some form of suture or plication of the gastrohepatic omentum. Beyea has treated 26 cases in this way, all of which had resisted skilled medical treatment, and had suffered severely from three to fifteen years. The patients had become emaciated, weighing from 77 to 120 lb. Twenty-four of the twenty-six patients were benefited, with an average gain in weight of 20 lb. Eve reports 7 cases on which a modified gastrohepatic omentum plication was done. Six of these patients were well from nine months to four years after the operation. Beyea, on account of the good results following operative procedures, believes that the neurasthenia is a purely secondary condition in these cases, but, nevertheless, says that operation should only be done when other treatment falls short of a cure. Rovsing has had a large experience with the operation and highly commends it; but, outside the reports of these three men, there are only a few cases on record. Whether the enthusiasm which greets this new operative method will have the same history, as the now almost discarded gastro-enterostomy for gastroptosis, remains to be seen.

Goldthwaite and Brown have placed gastroptosis and enteroptosis as the causative factor, or one of the causative factors, in the etiology of rheumatoid diseases, believing that the disturbed pressure-relations within the abdomen incident upon gastroptosis result in a disturbance of intestinal function, both secretory and motor. This gives rise secondarily to increased activity of intestinal bacteria; and the toxines so produced are, according to the theory of these authors, the cause of the arthritis. Too few observations have yet been made, but the suggestions are worthy our close clinical attention.

DIAGNOSTIC AND THERAPEUTIC NOTES.

THE TREATMENT OF SYPHILITIC HEART AND ARTERIAL DISEASE.—
Oigaard (*Zeitschr. fuer klin. Med.*, Vol. 73, Nos. 5 and 6). The Wassermann test is indispensable in the diagnosis of cardiac and arterial disease. The commonest forms of syphilitic disease of the circulation are aortic aneurysm, aortic insufficiency and syphilitic aortitis. In these cases the Wassermann test is usually strongly positive even when a long period of time has elapsed since the primary lesion. The treatment should consist exclusively in the administration of mercury. The outcome is often surprisingly good, better than in heart disease, apparently less grave but due to other causes. The iodides are practically useless in these conditions. The mercury treatment must be kept up for a long period of time, until all the subjective symptoms disappear, and for at least three weeks after the Wassermann reaction has become negative. A reappearance of the symptoms indicates a renewal of the treatment, even though the Wassermann test remains negative. The writer also reports a case of syphilitic nephritis with severe albuminuria and strongly positive Wassermann reaction, that cleared up entirely after three months' treatment with mercury and sodium iodide.

A CUTANEOUS REACTION FOR SYPHILIS.—Noguchi (*Journ. Exper. Med.*, Vol. 14, No. 6). After Noguchi had succeeded in growing the spirochæta pallida in pure culture on artificial media, its use for diagnostic purposes seemed an obvious step. He uses a fine emulsion of pure spirochætæ culture, sterilized by heat at 60° C. This suspension he calls luetin. It is injected intradermally, as in the similar tuberculin test, in quantities of 0.05 c.cm. A positive reaction consists of a papule (occasionally a pustule) at the site of injection, with a marked inflammatory areola. There is sometimes a slight elevation of temperature, but never any subjective discomfort. He found the reaction positive in all active cases of tertiary syphilis, in 94 per cent. of latent tertiary syphilis, and in 96 per cent. of hereditary syphilis. In the primary and secondary stage the reaction was rarely and then only feebly positive, unless indeed the cases had been energetically treated, when a positive reaction was the rule. The luetin test compares favorably with the Wassermann reaction; it is more constantly positive in late syphilis, and is less easily affected by treatment. Parasyphilitic affections did not give satisfactory results; for these Noguchi is preparing a more active luetin.

If Noguchi's observations are confirmed by others, the test promises to be of extreme importance to the practitioner. The latter will, however, demand very conclusive evidence that all of the spirochætæ have been killed in the preparation of the vaccine. The artificial production of a chancre at the site of inoculation would be no slight catastrophe.

THE LOCAL USE OF SALVARSAN IN ULCERATIVE AFFECTIONS OF THE MOUTH.—Zilz (*Muench. med. Wochenschr.,* No. 1, 1912). A great variety of ulcerative affections of the mouth are due to spirochætæ. These include not only syphilitic patches but also ulcers belonging to the class of Vincent's angina and various ulcerative lesions about the roots of the teeth, such as pyorrhea alveolaris and the like, due to the spirochæta dentium. All these lesions yield to the local use of salvarsan. The technique is simple, the salvarsan being used as a 10 per cent. aqueous or glycerine solution, or as an emulsion of the same strength in liquid paraffine. After the suppurating surfaces have been carefully wiped clean with a warm, saline solution, the salvarsan solution or suspension is applied locally from one to three times daily, according to the severity of the infection. The advantage of the emulsion is that it can be used for several days, while the solution must always be made up freshly. The results so far have been entirely satisfactory, and in no case has there been any evidence of intoxication.

ALBUMINURIA AND ACID URINE.—Hoesslin (*Deutsch. Archiv fuer klin. Med.,* Vol. 105, Nos. 1 and 2). The writer shows that in certain cases of nephritis the albuminuria is dependent upon the degree of acidity of the urine, so that, when the latter is made alkaline, the albuminuria diminishes or disappears. An increase in the acidity of the urine, on the other hand, increases the percentage of albumin in the urine. As the albuminuria diminishes, with the lessening of urinary acidity, the formation of casts also becomes scantier. This relationship by no means holds good for all cases of nephritis, and as yet we have no means of ascertaining in what cases there is a relationship between urinary acidity and albuminuria. The writer therefore considers it imperative to determine the urinary acidity in every case of nephritis and, if it is high, to administer sodium bicarbonate in daily doses of 2 to 8 grm. until the urine is alkaline. If the albuminuria reacts favorably to this medication, the latter should be continued for long periods of time.

THE GUAIAC TEST FOR OCCULT BLOOD.— Zœppritz (*Muench. med. Wochenschr.,* No. 4, 1912). The guaiac test for occult blood in the stool still remains the one most generally useful. Zœppritz suggests a slight modification of the customary procedure that, while it somewhat complicates the method, renders it still more reliable. The stool to be examined is rubbed up to a thick creamy consistency with a little water, and is then mixed with one-third to one-half of its bulk of glacial acetic acid. The mixture is poured into a test-tube and lightly shaken with 5 c.cm. of ether. The latter is poured off, washed once with water, and poured into a clean test-tube containing a trace of finely powdered gum guaiac. A strip of filter paper is dipped into some old oil of turpentine, and the ethereal stool-extract poured over it. In the presence of blood, a blue color appears at the site of contact of ether and turpentine.

In connection with the above it may interest our readers to learn of a rapid method of obtaining "old" (*i. e.,* ozonized) oil of turpentine, originated by the late Dr. Wm. H. Rush, of St. Louis. Some commercial

turpentine is poured into an evaporating or other open dish and without being covered is heated for about a half hour on a water-bath. An ideal "old" oil of turpentine results.

A New Use for Hexamethylentetramine (Urotropin).—Zak (*Wien. klin. Wochenschr.*, No. 4, 1912). The writer's method is based upon the observation that urotropin, if given in sufficient doses, is excreted not only by the salivary glands but also by the bronchi. It thus differs from other drugs in that when given by mouth it is able to exert a disinfecting action within the lungs. He found that when it was given in pneumonia, the sputum was noticeably poor in micro-organisms, and he suggests that it may be useful, not only in this condition, but in tuberculosis, bronchitis, and pulmonary gangrene. In the latter condition, especially, it seems to lessen the decomposition of the sputum.

Its antiseptic action upon the contents of the gall-gladder seems to be increased by combining it with sodium salicylate (saliformin). In some cases, too, it seems to exert an antifermentative action upon the stomach-contents.

The Treatment of Gonorrhea of the Cervix.—Wagner (*Berl. klin. Wochenschr.*, No. 52, 1911). In gonorrhea of the cervix, the writer strongly recommends irrigating the vagina with hot water. A speculum is introduced into the vagina, so that the cervix is brought into view, and then 20 to 25 litres of water at 45° C. (113° F.) are allowed to flow in under moderate pressure. In about 85 per cent. of his cases, the writer was able to render the cervix free from gonococci, by this method, in from twenty-six to thirty-five days. He recommends it also for the vaginal gonorrhea of children.

Treatment of Gonorrheal Arthritis.—Bain (*British Med. Journ.*, Dec. 30th, 1911). The writer has had the best results in gonorrheal arthritis by a careful treatment of the local gonorrhea. He first cleanses the urethra with warm water, then cocainizes the bladder, irrigates the latter with a dilute solution of silver nitrate; allowing the patient to evacuate the solution himself. This procedure is repeated every other day and results in a cure of the gonorrhea and of the arthritis in two or three weeks. The method represents a return to the mode of treatment in favor a generation ago. From the newer methods of treatment, especially the gonococcus vaccine, the writer has failed to obtain satisfactory results.

PRACTICAL MEMORANDA.

A SIMPLE AND SATISFACTORY PREPARATION OF THE SKIN AS A PRELIMINARY TO SURGICAL OPERATION.

By Howard A. Kelly, M. D., and C. F. Burnam, M. D., of Baltimore.

About two years ago we welcomed the use of the well-known iodine method as a substitute for the more elaborate and apparently less satisfactory scrubbing of the skin with soap and water, followed with alcohol and bichloride of mercury solutions. During the past year we have given up the iodine and have employed, with uniformly satisfactory results, the following procedure: The patient is first anesthetized and is then shaved, using alcohol in place of soap to facilitate the process. Following the shaving, the skin is wiped off with ether and then with alcohol. The entire procedure takes very little time; it is easy of application; the chemicals used are always present in the operating room for other reasons than cleaning, and the resultant sterilization of the skin, so far as clinical results show, is superior to the other methods which we have employed. Almost any skin of the body will tolerate this form of cleaning.

THE SURGEON AND HIS HANDS.

By Francis Reder, M. D., of St. Louis.

Von Langenbeck used to say that "every surgeon dies of a broken heart."

Leuning interpolates and lays considerable stress on septic infection which overtakes all surgeons sooner or later. A seemingly trivial affection of this kind, he says, is undoubtedly able to set up an arteriosclerosis. Many of my fellow-surgeons will agree with me that septic infection is not at all an infrequent occurrence with a surgeon. And why should this be so? Is it carelessness or is it ignorance? With the exception of a very few instances, the latter is responsible. It is an ignorance of a peculiar kind. The surgeon is wholly unconscious that he has a scratch, or a prick, or a small cut upon his fingers. An examination of the hands before an operation may find them in perfect condition. It is during the operation that these microscopic injuries may take place, the surgeon being so absorbed in his work as to be entirely unconscious, or he may ignore and then forget that he has inflicted a minute trauma upon the skin of his fingers or hands. He may continue to operate, and may not experience any untoward results. He may, however, continue in his work and become infected. At any event, it is always advisable to be on the safe side. I have, for years, practised the immersion of both hands, immediately after an operation, in a basin of alcohol for a few seconds to determine any minute trauma that might have been accidently inflicted. The alcohol coming in contact with any part of the skin that has suffered

a solution of continuity, no matter how minute, will cause a distinct burning sensation at the sight of the trauma. It is a splendid prophylactic agent and can be recommended.

AN ABDOMINAL SUPPORTER FOR ENTEROPTOSIS AND MOVABLE KIDNEY.

By Arthur Stein, M. D., of New York.

The abdominal supporter described below is modeled after the one originally devised by Schatz, of Rostock (Germany), and perfected by the writer only in a few details. Its principal advantage is, in the writer's opinion, that it is made of metal and will last indefinitely; furthermore, that, having once been made to measure, it will retain its shape and thus uninterruptedly perform the work demanded of it—differing from the elastic suporters on the market which, as is well known, soon lose their elasticity and become useless.

The supporter consists of an anterior aluminum plate which fits the abdominal surface and is well padded on the inner or skin side; in fact,

all parts which hug the skin are well padded, and covered with leather on the outer side. The plate is held in place by two lateral spring-bands forming a belt around the abdomen. They are made of the finest steel and carry at their free ends, smaller square-shaped aluminum plates, which rest in the lumbar region immediately over the kidneys. The three plates are made of aluminum and the springs of steel. The supporter is also provided with the usual thigh-straps which are attachable to buttons and fastened both to the front as well as to the back, and the weight of the supporter is only ½ to ¾ lb. From this description its advantages will be plainly recognized.

The supporter must be made to measure in each case. It has rendered the writer excellent service in general enteroptosis and in cases where one or both kidneys were movable. Following is a brief report of a case in which he really tested the supporter for the first time. Patient had

undergone three previous operations for floating kidney, with no success and was now fitted with one of these supporters. This practically cured her entirely, the case having been followed for more than two years. He has given similar treatment in a few other cases, and has received reports from all patients to the effect that the supporter exerts firm pressure, supports the abdomen well, and that all pains were abolished. One of his patients has recently had a new supporter made after having worn the first one for three years.

The binder is put on in the prone position while the kidney is in its normal position, and it will be seen that as the pressure is exerted from both the anterior and posterior direction, the kidney will be held in place.

A SIMPLE APPARATUS FOR THE INTRAVENOUS ADMINIS-TRATION OF SALVARSAN.

By RICHARD S. WEISS, M. D., of St. Louis.

It is my desire to call the attention of the profession to a simple and efficient apparatus for the intravenous administration of salvarsan. The idea is not original, it having been suggested to me by Dr. P. G. Hurford; and I have seen a description of a similar apparatus in the *Deutsche*
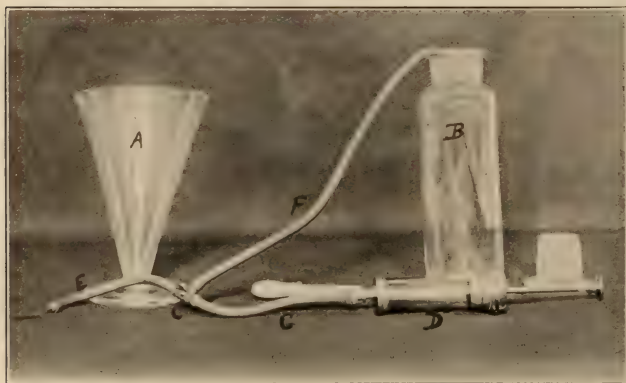
Medicinische Wochenschrift. I have used it in a large series of cases, both in private practice and in the Dermatological Clinic of Washington University, with complete satisfaction both to the operator and to the patient.

The ideal apparatus should be light, should have few parts, all of which may be sterilized by boiling, should not be bulky, and should be capable of being easily cleaned. This one apparently answers every requirement.

The complete outfit for the preparation and administration of salvarsan consists of the following parts:—

> Conical 250 c.cm. graduate.
> 1 or 2 c.cm. pipette or dropper.
> 300 c.cm. graduated bottle with ground-glass stopper.
> Three way stopcock.
> 20 c.cm. Record syringe.
> Two five-inch-lengths pararubber pressure tubing.
> One sixteen-inch-length pararubber pressure tubing.
> Needles.
> These parts are connected as shown in the picture.

Salvarsan solution is first prepared in bottle B. Graduate A is filled with hot normal saline (110° F.), and tube F is placed therein. Stopcock C is now turned so as to connect tubes F and G, and syringe D is filled with saline. Tubes E and G are now connected, and saline is forced out of the needle. This procedure drives all air out of the apparatus. Syringe D is now half filled with saline, tubes E and G again connected, and the needle is inserted into the vein. Saline should then be sent through the needle proving it to be in the vein. (If it is not, no harm is done by the saline.) Tube F is now placed in bottle B containing the prepared salvarsan, which is slowly injected in the same way as the saline. When it is all injected, tube F is replaced in graduate A, and more saline is injected to wash out the salvarsan still in the apparatus. Remove needle from the vein, and wash apparatus with alcohol and ether. Occasionally some air will collect in syringe D. This can be controlled by keeping the syringe pointed downward while injecting; the air will then collect next to the plunger, which need not be pressed quite home.

It may be necessary to place graduate A and bottle B in hot water to keep the solution at about 110° F. However, when the operator becomes expert with the apparatus, this will be unnecessary as the solutions will remain at the proper temperature about fifteen minutes.

The advantages claimed for this apparatus are the following:—

1. Few and small parts, hence easily and completely sterilized by boiling.

2. Has no tall cylindrical containers which permit rapid cooling of the solutions.

3. Light and not bulky; hence may be carried to and used in private residences. I do not advocate this as a routine measure, but for the country practitioner it is indeed an advantage.

4. The pressure is absolutely under the control of the operator, the usual time consumed during the injection being ten minutes.

5. Can be used without assistants, in which case the needle should be held in the vein with a strip of adhesive plaster.

SOCIETY PROCEEDINGS.

ST. LOUIS MEDICAL SCIENCE CLUB.

The regular meeting of the St. Louis Medical Science Club was held on Tuesday evening, March 12th, 1912, at the Barnard Free Skin and Cancer Hospital. Dr. Leo Loeb presided. The following program was listened to:

1. Demonstration: Guinea-Pigs Showing Pigmentary Changes in Transplanted Skin...M. G. Seelig
2. Phosphorus Metabolism During Early Cleavage of Echinoderm Eggs...L. F. Shackell
3. Some Unfamiliar and Some New Periosteal Reflexes (with demonstration)...A. Myerson
4. Observations on Corneal Regeneration (with demonstration) ....Meyer Wiener
5. Effects of Cold Air Upon Blood-Pressure in Pneumonia of Children...John Howland
6. The Growth of a Yeast in the Animal Body and with Tissues in Culture Media (Presented by Title.)................................
................Leo Loeb, Geo. T. Moore, and Moyer S. Fleischer

Abstracts of these communications follow.

(Signed) W. E. GARREY, *Secretary.*

PHOSPHORUS METABOLISM DURING EARLY CLEAVAGE OF ECHINODERM EGGS.

By L. F. SHACKELL, of St. Louis.

Masing, 1910, compared the nuclein content of unfertilized eggs of Arbacia pustulosa with that of embryos of 500 to 1,000 cells. He found, on chemical analysis, no increase of nuclein compounds during segmentation, at least as far as the "morula" stage. Using a somewhat different analytical procedure, the writer recently compared the nuclein content of eggs of Arbacia punctulata in the two-celled and early blastula stages. There was no appreciable difference in the nuclein content of eggs of these two stages, thus confirming the earlier work of Masing. It seems, therefore, necessary to assume that the nuclein compounds required for the increased number of nuclei following cleavage of the ovum are preformed in the egg.

The writer found, also, that there was no change in the total quantity of water-soluble or alcohol-soluble phosphorus during early segmentation. These results, as also those on the nuclein content of developing eggs, fail to support the view of J. Loeb that an increasing number of nuclei, all of practically the same size, presupposes a relatively great chemical synthesis of nuclein during cleavage, and that this newly formed nuclein has been derived through the splitting of lecithin, originally in the egg.

SOME UNFAMILIAR AND SOME NEW PERIOSTEAL REFLEXES.

By A. Myerson, M. D., of St. Louis.

1. A series of reflexes can be elicited by striking the ulnar styloid process. The responses consist of a contraction of the triceps, the deltoid, and in some cases the scapular muscles.

2. A series of adductor responses, both homolateral and contralateral, can be elicited by striking the following points:—

    (a) The internal condyle of the humerus; in which event the homolateral adductions are stronger than the contralateral.

    (b) The tibia; the homolateral responses are stronger than the contralateral in this case.

    (c) The sole of the foot; in this case the contralateral responses are stronger than the homolateral.

    (d) The external condyle; the contralateral responses are stronger than the homolateral.

    (e) The anterior superior spine of the ilium; here also the contralateral responses exceed the homolateral in intensity.

The reflexogenous zones were variable and often very broad.

Correlations:—

    (a) The breadth of the zones and the liveliness of the reflexes is generally in direct relation to the tendon reflexes of the individual.

    (b) The adductor responses have no relation to the ankle-jerk or Babinski phenomenon, but bear a direct relation to the knee-jerk.

    (c) A moderate tibial and internal condylar adductor response is present in many "healthy" individuals.

    (d) Very lively adductor responses, especially the contralateral type, elicited from the spine of the ilium and the internal condyle, give a sign of organic disease. Wide reflexogenous zones constitute a significant phenomenon.

OBSERVATIONS ON CORNEAL REGENERATION.

By Meyer Wiener, M. D., of St. Louis.

The success achieved in these experiments is attributed to the method or technique.

The eye is fixed with a fixation thread, or fixation forceps. An incision is made immediately above the scar with a small, sharp scalpel. It is essential that the point of this knife be extremely sharp. The first incision should be deep enough to go beyond the depth of the scar, but not deep enough to puncture Descemet's membrane. A vertical incision is then made perpendicularly through the scar from the middle of the horizontal cut. One of the greatest difficulties is to start the dissection. A sharp-pointed small hook is used for this purpose with which the cornea is lifted at the angle of incision and carefully dissected down, as deep as one dare go. So soon as the corneal flap is well lifted, the hook is replaced with a small, strong rat-toothed forceps, which grasps firmly and permits greater tension to be exerted so that the fine fibres connecting the layers may be seen as a delicate white mesh. These are gently and carefully severed with the knife.

The blade of the knife is always kept parallel with the flat surface of the cornea. After the edge of the flap is once raised, the further dissection, with practice and care, is not difficult.

That there must be a permanent thickening of the newly dissected area is evident from the disappearance of the depression at the sight of incision, seen both macroscopically and microscopically in the animals and specimens.

After a few months, the operated area is almost perfectly clear, except by oblique illumination.

THE EFFECTS OF COLD AIR UPON THE BLOOD-PRESSURE OF CHILDREN WITH PNEUMONIA.

By JOHN HOWLAND, M. D., of St. Louis.

Howland and Hoobler studied the effect of cold air on the blood-pressure of children in the febrile stages of acute pneumonia and in convalescence from the disease. The effect of cold fresh air in patients with active pneumonia was always to produce a rise in blood-pressure; and removal to a warm but well ventilated ward was to produce a fall in blood-pressure. The rise and fall varied in amount, but the average was about 12 mm. of mercury. The rise is not apparent for half an hour or more after being placed out of doors, and it does not reach its maximum for about two hours. Thereafter the effect is continuous for even as long as thirty hours, and no tendency for the pressure to fall, as if from exhaustion of the effect, has been observed.

On the other hand, removal from the cold air to a warm ward was always to produce a fall of blood-pressure. The fall was more rapid than the rise and usually reached its lowest point in an hour.

In convalescents the results were much less striking and often absent.

The effect is to be explained by reflex stimulation of the vasomotor centre by the action of the cold air on the skin of the face and on the nasal mucous membrane. No other part of the children was exposed, and there was no additional factor that could be supposed to play a part.

THE GROWTH OF A YEAST IN THE ANIMAL BODY AND WITH TISSUES IN CULTURE MEDIA.

By LEO LOEB, M. D., GEORGE T. MOORE, Ph. D., AND MOYER S. FLEISCHER, M. D., of St. Louis.

We made a study of a yeast isolated from a case of human cancer, compared its growth in the living animal body, in tissues growing in culture media as well as in ordinary culture media without the presence of living tissues.

Some of our conclusions are as follow:—

1. After intravenous injection into a rabbit, the yeast is found in various organs in which it may multiply for a relatively short period of time. It produces, however, marked lesions almost exclusively in the cortex of the kidney and only occasionally in the heart. If a sufficient number of yeasts have been injected, the animals die, and in the great majority of cases the death is, in all probability, due to the interference with the renal secretion following the invasion of the kidney by the

yeast. To some extent the yeast represents, therefore, an agency through which we may exert an almost specific effect upon the kidney.

2. The yeasts penetrate from the vessels into the convoluted tubules of the kidney within the first day. Very soon polynuclear leucocytes surround and attack the yeasts. Later lymphocytes and connective-tissue proliferation may be found in the periphery of the lesion. In cases in which the animals survive for a sufficiently long period of time, the leucocytes succeed in suppressing the yeasts. In cases in which the animals die after the injection of the yeast, the injurious action of the leucocytes upon the renal tissue and function is added to that of the yeasts, and the animal body is thus injured considerably by its own protective mechanism.

3. Another protective mechanism we observed in the medullary tubules of the kidney. Here epithelial cells may, after changing to giant cells, act as phagocytes and apparently destroy the yeasts.

4. Substances changing circulatory conditions in the body do not markedly alter the distribution of the yeasts in the various organs. The yeasts behave after intravenous injection in a similar manner as certain stains. Both are to a great extent eliminated into the convoluted tubules of the kidney. Here the yeasts find a favorable soil for proliferation.

5. In the test-tube, yeasts and the kidney of an injected rabbit grow side by side in coagulated blood-plasma. Under those conditions the kidney and connective-tissue cells may for some days show more marked activity than normal kidney without yeasts. Very soon, however, the yeasts, free from the attack of leucocytes, invade the living kidney cells, first their cytoplasm and later their nucleus. The rest of the kidney tissue, not directly attacked by the yeast, dies gradually, while the yeasts multiply in the dead kidney tissue as well as in the culture media.

CORRESPONDENCE

PARIS LETTER.

THE VISCOSITY OF THE BLOOD.

By Auguste A. Housquains, M. D.

As a result of the investigations which have been made in the last few years in the matter of arteriosclerosis and arterial tension, a new idea of the greatest importance has been introduced in pathology—namely, the viscosity of the blood.

Truth to say, the viscosity of the blood was mentioned in medical literature some sixty years ago by Poiseuille, who set forth its causes. Later Gubler made it the object of interesting investigations. Afterwards this subject fell into desuetude, from which to-day it has been rescued by the interesting investigations of Alfred Martinet.

As this author has forcibly put it, there were two reasons why viscometry of the blood was not until lately part of our clinical practice. The first reason was on account of the technique which was difficult, since it was no easy matter to make practical deductions by means of the old viscometers. The apparatus was large, very costly, and it further had the inconvenience of necessitating the use of a relatively large quantity of blood; in fact, many cubic centimetres were necessary for the most simple examination. Moreover the manipulation took a long time, often causing the coagulation which vitiated the results desired. The second reason why the study of viscometry was given up was purely dogmatic, as the results obtained by the old-fashioned apparatus were often contradictory. Again, it was not possible to establish in this way a clinical synthesis of value; hence, no practical results came of these investigations.

Alfred Martinet, desiring to evade the inconvenience of the old method and to obtain results which would have real utility from a clinical standpoint, has had recourse to the most simple of all apparatus. Not the least interesting part of his investigations has been the results furnished by the study of arterial tension and those furnished by investigations as to the viscosity of the blood. It is a fact that the isolated study of the viscosity of the blood, though it furnishes results of scientific interest, is not, from a practical standpoint, of incontestable utility. But if the arterial tension and the viscosity are studied at the same time in a systematic fashion, we can, as demonstrated by Martinet, make the question one of practical value, that is to say, achieve tangible results equally from the point of view of diagnosis, prognosis and treatment.

Let us say at once that Martinet uses exclusively the viscometer of

Walter Hess. In spite of the simplicity of its principle and the rapidity of its function, this apparatus, experience has shown him, fills all the conditions required for measuring the viscosity of the blood in clinical practice. In the first place, its employment necessitates only a small quantity of blood, in fact some drops suffice; and a simple puncture at the extremity of the finger or in the auricle yields the necessary fluid. In the second place, it permits a rapid measurement, thus doing away with the great obstacle to the study of viscometry—the coagulation of the examined blood. The way to prevent this inconvenience is to make the examination in less than a minute. Besides the advantages of using but little blood and its utilization which is rapid, and the fact that this apparatus is easily kept clean, the numerous and precise observations are its greatest asset. Finally,—and these details are of considerable importance,—the apparatus of Walter Hess is small, not fragile, is easily carried, and its manipulation is not complicated. It consists of a glass tube shaped like the letter U, having at the convexity of the curve a small tubule to which is attached a rubber pouch, the walls of which are very strong, and which has a small lateral opening that can be closed at will, thus permitting the pouch to be used either for aspiration or compression. When the two ends of the U-shaped glass tube are placed into the two solutions consisting of distilled water, and aspiration is effected by means of the pouch, and if, at a certain moment, the aspiration is interrupted and the apparatus is held upright, the fluid stands in the two branches of the glass tube at the same level, which is then marked on both branches. The level shows the equal viscosity of the fluid employed, since in both branches of the tube water has been used. If, instead of using two solutions consisting of water, one is replaced by blood, and the preceding process repeated until the blood has obtained the level which was marked on the tube, we will see that the water in the other branch of the tube will be elevated two, three, or four times higher than when water was used in both branches. By this means it is possible to say that the viscosity of the blood is two, three, or four times greater than that of water. In short, by simply reading the mark on the tube, the viscosity of the blood relative to that of the water will be given by this apparatus. Having shown the principles of this method, let us now take up the results which are attained.

The isolated study of the viscometry of the blood yields the conclusion that the viscosity is a constant physiological factor, just as are the number of pulse-beats, the body temperature, or the arterial tension. Alfred Martinet, as the result of numerous measurements, has adopted, as the approximative limit of the viscosity of the blood in normal man, 3.8 to 4.5. In the pathological condition the viscosity varies to a considerable degree. This same author notes as extreme figures 1.9 and 7.8. In his opinion the principal factors which cause the variability of the viscosity of the blood are hydremia, anoxemia, globulia, hyperglycemia and hyperuricemia.

The viscosity is lower in hydremia and hypoglobulia; it is higher in anoxemia (cyanoses due to asphyxia), hyperglobulia, hyperleucocytosis, hyperglycemia, and hyperuricemia.

It is also necessary to record that these results are only of a theoretical interest; but it is a different matter when the viscosity of the blood and the arterial tension are simultaneously studied, for when this is done these two factors are of the greatest interest from a pathological standpoint as well as from a clinical, and have a bearing on the prognosis and treat-

ment. In the course of the short study contained in this letter it is impossible to take up in detail the numerous cases observed by Alfred Martinet; hence, the following conclusions are merely a resumé of his cases.

At the present time it is the custom to consider arterial hypertension synonymous with arteriosclerosis, but this is a wrong interpretation of the conditions and the true meaning of the terms. "In fact," says Martinet, "it is very far from the truth to say that all conditions accompanied by arterial hypertension are arteriosclerotic in nature." Besides angiospasms, in which the tension is variable, there are a great number of instances of hypertension which are due to simple plethora, whether gouty or diabetic, and which, by the correction of the diet, can be brought back to normal tension without the necessity of determining the lack of cardiovascular equilibrium. But these gratifying results are not possible in cases of undoubted vascular sclerosis.

The comparative study of arterial tension and viscosity has resulted in separating the following two groups of hypertension:—

1. Hypertension due to increased viscosity, called by Martinet hypertension with hyperviscosity, is for the most part the result of the simple plethora which obtains in gout or diabetes when the vascular renal system has not as yet become affected. This sort of hypertension is always curable.

2. Hypertension due to a low viscosity, which Martinet calls hypertension with hypoviscosity, is always of a cardiorenal nature. In a case such as this the vascular renal sclerosis is more or less advanced and more or less extensive, and the lesions are, in divers degrees, irreparable.

From the point of view of the prognosis, the comparative study of tension and viscosity of the blood permits us to follow the evolution of the circulatory affections with at least as much precision as the thermic curve permits us "to follow the evolution of pyretic affections." For example, in cases where the renal arterioles are sclerotic, and where the accord between the elevation in the tension and the viscosity has not been disturbed, the prognosis is good; but, on the contrary, if the hypertension persists and increases while the viscosity decreases, this dissociation makes the prognosis grave.

To show that these elementary ideas of sphygmoviscometry are not merely of theoretical importance, it is only necessary to study the practical results which Martinet attained in the province of the therapy of cardiorenal diseases. We know the rôle that has been played and is still being played by the iodide medication in the treatment of arteriosclerosis; and, according to the observations of Martinet, the iodides, given in smaller doses or less frequently, are not only indicated but are certainly of value in hypertension with hyperviscosity; and, when associated with the proper diet and good general hygiene, they lower, at the same time, the tension and the viscosity. On the contrary, the iodides are always contraindicated where there is hypertension with hypoviscosity, that is to say, in arteriosclerosis; especially in cardiorenal sclerosis, a condition in which the iodides, though they may lower or decrease the viscosity of the blood, decrease at the same time the diuresis and increase the arterial tension,—results which are deplorable. Iodide medication in persons threatened with uremia or cerebral hemorrhage is a very dangerous procedure.

Another therapeutic means which has been evolved from the idea of the relation between viscosity and arterial hypertension is the adminis-

tering of liquids. In hypertension with hyperviscosity large quantities of water are tolerated; in fact, where the function of the heart and kidneys is good, a veritable lavage of the blood is permissible, that is to say, a cleansing of the organism. On the contrary, where there is hypertension with hypoviscosity, water should be taken in moderate quantities; in fact, in these cases the increase in the liquid diet is often followed by a decrease in the urinary secretion, and the result is that the urinary elimination is retarded, the arterial tension is increased, and the viscosity of the blood is lowered on account of a retained hydremia.

It may be added here that physicians in charge of health resorts follow the aforementioned rules; but the daily therapy of their patients would be greatly at fault were it not for the interesting work which Martinet has done in connection with the study of sphygmoviscometry.

It would be impossible to state in this letter all the interesting and practical deductions which have resulted from the study of viscometry, and especially from viscometry in its relation to arterial hypertension; but even from what has been said it can easily be inferred that the interesting investigations of Alfred Martinet are not only for the present, but will undoubtedly have a bearing on all further studies of arterial tension and viscometry.

March 10th.

BOOK REVIEWS.

A CROSS-SECTION ANATOMY. By Albert C. Eycleshymer, B. S., Ph. D., M. D., Professor of Anatomy, St. Louis University; Formerly Assistant Professor of Anatomy, University of Chicago; Sometime Assistant Professor of Embryology, Rush Medical College; and Daniel M. Schoemaker, B. S., M. D., Associate Professor of Anatomy, St. Louis University; Formerly Assistant in Anatomy, University of Chicago. Average Position of Organs from Eleven Reconstructions, by Peter Potter, A. M., M. D., Formerly Associate Professor of Anatomy, St. Louis University, Sometime Instructor in Anatomy, University of Missouri; Sections of the Female Pelvis, by Carrol Smith, A. B., M. D., Instructor in Anatomy, St. Louis University; Drawings, by Tom Jones, Instructor in Drawing, St. Louis University. New York and London: D. Appleton and Company. 1911. Price $20.00.

This work is in atlas form, illustrated by 113 cross-sections, nearly life size, taken at various levels through the head and neck, thorax, abdomen, pelvis (male and female) and extremities. There are also 14 "key-figures," mostly in colors, which serve to interpret the cross-sections by indicating on the body surface the levels at which they were taken, and also representing the body as a "transparency" revealing the various internal organs. A concise explanatory text is also provided. The sections are worked out in great detail and labeled by an ingenious method which enables one to refer instantly to any desired structure, even though more than 100 parts may be shown in one section. There is a complete and convenient index, both for the BNA and for the older anatomical terminology. In the introduction, a historical account of the use of cross-sections is given, and also detailed explanation of methods for making and studying them. One chapter is devoted to the results of an extensive research upon the average position and variation of the organs, with references to the literature. As a whole, the work is a masterpiece of painstaking accuracy and reflects great credit both upon the authors and the publishers. It will rank among the anatomical classics.

This great work is especially significant as indicating a growing recognition of the value of the sectional method for the study of gross anatomy. This method of course in no respect replaces that of the ordinary dissection, but it does form a most valuable supplement. As Henle pointed out long ago, the clinician should have such a knowledge of anatomy as will render the living body transparent to him. "The purpose of this (cross-section) anatomy, then, is to show the student the essential step between dissection and visualization; to suggest to the anatomist a basis for an exact anatomy and to furnish the clinician a gross anatomy in practical form." A clear and accurate knowledge of the position of the various organs is of great value, not only to the surgeon, but also to the physician in his every-day work in physical diagnosis. This cross-section anatomy should therefore find a useful place in the library of every progressive practitioner.

SEMIOLOGIE REELLE DES SECTIONS TOTALES DES NERFS MIXTES PERIPHERIQUES. Par Henri Claude, Professeur Agrégé Médecin de L'Hôpital Saint-Antoine, et Stephen Chauvet, Interne des Hôpitaux de Paris. Paris: A. Maloine. 1911.

This is a valuable monograph on a subject which is at the present time of unusual interest. The author remarks in his preface that if the researches of Head, J. Sherren and Rivers are excluded, as well as the work of Babinski and Tournay upon the disturbances of sensation, one would be astonished to discover that all these labors have been directed to the elucidation of the phenomena of degeneration and regeneration. The clinical side of the question has been almost completely neglected. It is to fill this gap in the literature of peripheral nerve surgery, from the point of view of its neurological importance, that this little book has been written. The authors have had occasion to observe carefully a number of peripheral nerve sections, and, furthermore,

they have been able to follow these by careful, minute, and repeated clinical examinations.

In the first part of this work the authors analyze the different elements in the symptomatology of total recent sections of mixed peripheral nerves. In the second part, they illustrate by clinical examples the application of the principles touched upon in the first part. In the first part the following subjects are treated: Motility, Electrical Reactions, Sensations, Vasomotor Reactions, Symptoms in the Sweat Secretions. Thermic and Nutritious Reactions of the Tissues. The second part is devoted to the discussion of cases; that is, purely from the standpoint of objective neurological symptoms.

The authors' conclusions are condensed under six heads. Among those of interest are the ones included under the fifth head, under the caption of Disturbances in the Vasomotor Sudorific Reactions. To these they have given special attention, because their diagnostic value is considerable and has never been properly appreciated. In addition, these symptoms can be easily demonstrated, if the technique of their demonstration is carefully known. They are more constant than the other symptoms, and they demand on the part of the observer special technical knowledge; they can neither be simulated nor hidden by the patient. They are, in fact, purely objective, and it is for this reason that the authors have accorded to them so great an importance.

A brief outline of this small book (only 95 pages) will be sufficient to indicate its purpose and its scope. It need scarcely be said here that the style and general character of the text is typical of the best French medical writing—that is to say, it is concise, beautifully written, intelligently planned, and, as far as one can see, absolutely unpadded. Thus within these few pages the reader can obtain practically all that is positively known of value on the subject that is treated. The illustrations are good and the printing and make-up of the book unusually satisfying. It is to be hoped that the publisher of this monograph may see fit to include in his series many others touching upon the vital questions of neurological diagnosis.

DIE INTRATHORAZISCHE STRUMA IN KLINISCHER UND RADIOLOGISCHER BELEUCHTUNG. Von Dr. Siegmund Kreuzfuchs. Wuerzburger Abhandlungen aus dem Gesammtgebiet der praktischen Medizin. Vol. XII, No. 4. Wuerzburg: Curt Kabitzsch. 1912. Price 0.85 m.

In presenting the subject of intrathoracic goitres from the internist's point of view, the writer expresses the opinion that this condition is far from being as unusual as is generally supposed. He is assistant at the Roentgen Institute of the great Viennese Polyklinik, and has there had occasion to see over 100 such cases. The symptomatology is a combination of the symptoms of mediastinal tumor and hyperthyroidism, and the diagnosis, possibly without its use, may be clinched by means of the x-rays. The treatment is surgical. The monograph is well written and is a worthy member of this excellent series of Wuerzburg dissertations.

MICROSCOPY, BACTERIOLOGY AND HUMAN PARASITOLOGY. A Manual for Students and Practitioners. By P. E. Archinard, A. M., M. D., Bacteriologist Louisiana State Board of Health and City Board of Health, New Orleans. Second Edition, Revised and Enlarged. Illustrated with One Hundred Engravings and Six Plates. Philadelphia: Lea and Febiger. 1912.

A brief presentation of bacteriological technique somewhat suggestive of a quiz-compend. The illustrations which are numerous are mostly taken from other publications. The value of such a book is questionable. The practising physician will find other manuals more useful for daily use in his office laboratory, while the bacteriological worker will prefer a more complete work of reference.

TRANSACTIONS OF THE AMERICAN CLIMATOLOGICAL ASSOCIATION. For the Year 1911. Volume XXVII. Philadelphia: Printed for the Association. 1911.

The twenty-eighth annual meeting of the American Climatological Association, of which this volume represents the transactions, met at Montreal on June 13th, 1911. A number of interesting papers were read and are here published. Anyone interested in the effect of climate upon health, especially in its relation to tuberculosis, will want a set of these translations upon his shelves.

BOOKS RECEIVED

FAMOUS CHEMISTS. By E. Roberts, B. Sc. (London). London: George Allen and Co., Ltd. 1911. Price, 2 s. 6 d.

WHO'S WHO IN SCIENCE. (International.) Edited by H. H. Stephenson. New York: The Macmillan Company. 1912. Price, $2.00 net.

DEATH. By Maurice Maeterlinck. Translated by Alexander Teizeira de Mattos. New York: Dodd, Mead and Co. 1912. Price, $1.00.

THE TAYLOR POCKET CASE RECORD. By J. J. Taylor, M. D. Copyrighted 1911 by the Medical Council Company. Philadelphia: The Medical Council Company. 1911.

STUDIES IN PSYCHIATRY. Vol. I, by Members of the New York Psychiatrial Society. New York: The Journal of Nervous and Mental Disease Publishing Company. 1912.

HEREDITY IN THE LIGHT OF RECENT RESEARCH. By L. Doncaster, M. A., Fellow of King's College. Cambridge: At the University Press (G. P. Putnam's Sons, New York). 1911. Price, $0.40.

AN INTRODUCTION TO EXPERIMENTAL PSYCHOLOGY. By Charles S. Myers, M. D., Sc. D., Lecturer in Experimental Psychology in the University of Cambridge. Cambridge: At the University Press (G. P. Putnam's Sons, New York). 1912. Price, $0.40.

AN ENGLISH HANDBOOK TO THE PARIS MEDICAL SCHOOL (With Map). By A. A. Warden, M. D., Visiting Physician to the Hertford British Hospital, Paris. Second Edition. London: J. and A. Churchill (P. Blakiston's Son and Co., Philadelphia). 1910. Price, 2 s.

AERZTLICHE FORTBILDUNGSKURSE DER FREIEN ORGANISATION FUER DIE MEDIZINISCHEN KURSE AN DER K. K. UNIVERSITAET WIEN. Postgraduate medical work under the patronage of the free organisation for medical courses at the University of Vienna. 3. Ausgabe. Wien. Urban and Schwarzenberg. 1912.

THE TIGHTENING OF LOOSE TEETH. Some Technical Innovations. By Surgeon-Dentist Witkowski (Berlin). Translated from the First German Edition by Edgar Neumann, M. D., and William M. Gabriel, M. R. C. S., L. D. S. Eng. London: Balliere, Tindall and Cox. 1912. Price, 4 s.

PHYSIOLOGY. A Manual for Students and Practitioners. By A. E. Guenther, Ph. D., Professor of Physiology in the University of Nebraska and Theodore C. Guenther, M. D., Attending Physician, Norwegian Hospital, and Visiting Physician, Tuberculosis Clinic of the Bay Ridge Hospital, Brooklyn, N. Y. Second Edition, Thoroughly Revised. Illustrated. Philadelphia: Lea and Febiger. 1912.

MANUAL OF SURGERY. By Alexis Thomson, F. R. C. S. Ed., Professor of Surgery, University of Edinburgh, Surgeon Edinburgh Royal Infirmary; and Alexander Miles, F. R. C. S. Ed., Surgeon Edinburgh Royal Infirmary. Volume First. General Surgery. Fourth Edition Revised and Enlarged, with 297 Illustrations. New York: Oxford University Press. 1911.

MANUAL OF PRACTICAL PHYSIOLOGY. Designed for the Physiological Laboratory Course in the Curriculum of the American Association of Medical Colleges. By John C. Hemmeter, M. D., Ph. D., LL. D., Professor of Physiology in the University of Maryland, Baltimore; Member of the Physiological Society of Germany (Deutsche Physiologische Gesellschaft). With 55 Illustrations. Philadelphia: P. Blakiston's Son and Co. 1912. Price, $2.50.

EDITORIAL.

MARRIAGE A LA SCIENCE.

If anyone would have the hardihood to contend that the present age is not one of science, he would declare himself unlettered so far as the tendencies of the times are concerned. Whenever an explanation of any problem is demanded, science is appealed to, at times in gentle tones and again in a voice imperiously commanding. Assuredly we have made a fetish of science, and, on account of our undivided worship now covering some years, are ever expectant and trustful that from this source will come the right and proper solution for all those vexed questions which are forever assailing us. Such trust should be rewarded, and that it is in most cases shows that our confidence has been well placed; but this does not mean that this modern Delphic oracle can answer every question satisfactorily or that, even though she is kind enough to lend some encouragement to our pleadings, the few sparse words which drop from her lips should be construed by the enthusiastic worshippers at her shrine as the last word on the subject. This thought occurs to us whenever we read a piece of light literature, be it a play or book written on scientific lines, or when any subject that needs but a common-sense interpretation is dragged into the lime-light of science, there to receive a drubbing so that all the benighted children of earth may not only see its scientific regeneration, but be made aware of their own purblindness in allowing themselves to form conclusions without the aid of this beneficent mistress. And in line with our uneducated way of thinking—uneducated in the sense that we are a bit old-fashioned in that our optimism is tempered enough by common sense to prevent its caracoling madly to conclusions—is the thought that marriages founded on science, or guided rather by "a certificate of health from a reputable physician to the effect

that they [the contracting parties] are normal, physically and mentally, and have neither an incurable nor a communicable disease," to use the Rev. Walter T. Sumner's words from his sermon on "The Sacrament of Marriage" delivered at the Protestant Episcopal Cathedral of Saints Peter and Paul, in Chicago, will add to that already distressing feature of American life—a further narrowing of one's personal liberty. In making this statement we are not whitewashing the deplorable effects of syphilis, or belittling the disasters which follow in the wake of the gonococcus which Bernard Shaw has so well described as a microbe that is not exclusively French; but we are contending against the promulgation of ideas that can be easily misconstrued, even by "a reputable physician," into meaning that his whimsicalities, his crotchets, his vagaries, in case he is a perfect Lombrosoite or Eugenist, must be brought into play in framing a certificate of health. This sort of reasoning would not be unusual, for though "the reputable physician" may be the most conscientious practitioner at the bedside, he is not so conscientious, or rather too conscientious, when he is wrenched from his proper *milieu* and is called upon to exercise functions which do not properly belong to his domain. No doubt many who are in favor of "scientific marriages" will cry out against this opinion and ask, if "the reputable physician" is not the one to decide, who then is? To which we would say, that though "the reputable physician's" honor cannot be impugned when he is dealing with the few diseases which should act as an embargo against marriage, his honor may not be of so high a quality when his enthusiasm resulting from the responsibility thrust upon him in his new rôle makes his judgment untrustworthy. Medical men have been known before to be swept off their feet by theories which they afterwards discarded as foolish; and if this is not only possible but highly probable as an oft-repeated occurrence inside the province of medicine, what are not the probabilities when they assume the part of judge in matters which, if explained from a medical standpoint plus diverse biases, would not only be incomprehensible to the laity, but so great an encroachment on the personal liberty of individuals, that race suicide would not be the problem in swaddling clothes, which it is to-day, but a giant of the strength of Hercules.

SURGICAL PATHOLOGY: OPERATING-ROOM DIAGNOSIS.

The internist has to make diagnoses in much the same manner as the engineer who cannot even look inside his engine. An experienced engineer can tell by the sound of his machine that a cylinder is missing fire, or that something is wrong with the oil-supply, and so an experienced

physician is supposed to tell by sound or by touch what is wrong on the inside of that most complicated machine—the human body. Unlike the engineer who verifies his guess by exposing the seat of trouble, the physician can only keep on guessing and apply remedies accordingly. If the results are good, his diagnosis is correct; if otherwise, then he must guess again. This is not an unfriendly criticism of the profession. Far from it, indeed; for if one considers the body as a machine and realizes the tremendous limitations imposed on the man who attempts to know its inside workings from external manifestations, the marvel remains, not that errors in diagnosis occur, but that correct diagnoses are ever made.

With the surgeon the situation is quite different. When the patient is handed to him, as a rule the case has been studied by a medical colleague who can present the *status quo* and give a fairly good guess as to what is to be found at operation. The surgeon now has the opportunity of carefully studying the condition before operation and of visualizing the picture he will find on the table. If he is a good surgeon, whose ability is not reckoned merely on skill in cutting and sewing, he will try to picture the position and condition of the appendix he is going to remove; and if conditions as he finds them are not as he expects, he will at least try to correlate and learn from his error. This is surgical pathology in its broadest sense, and as such it occupies a field of usefulness for thorough study compared to which even the autopsy table, lacking as it does the vital physiological element, takes second place. And it is only a proper conception of surgical pathology which distinguishes the good surgeon from the poor surgeon, and which makes surgery a more exact science than internal medicine.

We will take just two broad examples to emphasize the value of this contention. In diseases of the stomach the medical man meets at times almost insurmountable difficulties in diagnosis. In most instances he can only say that pyloric obstruction exists, or that surely an ulcer had been present; whether carcinoma will be found at the time of operation is in the field of conjecture. The surgeon sees and feels inside the abdomen a hard mass very near the pylorus, and he must be able to differentiate at once between a duodenal ulcer through which the pancreas presses and a carcinoma of the pylorus. Such differentiation is at times by no means an easy matter, and yet its importance to the subsequent life of the patient needs no emphasis. Here the diagnosis must be made on the spot; frozen sections are at best most unsatisfactory, and more detailed histological examination of a piece of tissue entails a second operation.

The second and most patent example will be found in the surgery of tumors; and for our purposes we will discuss only tumors of the breast. Both from a clinical and pathological standpoint breast-tumors are the most difficult to diagnose, and at times the combined resources of clinician and pathologist are taxed to the utmost in properly placing a given case. Modern research has shown definitely that mere histological examination is not a sufficient basis to classify tumors; in a large series of cases by such examination the pathologist cannot even declare a tumor to be malignant, and he must come to the surgeon, who follows the subsequent history of the case, in order to be properly orientated. For instance, it has been proved that approximately 90 per cent. of tumors in the female breast, occurring in the "cancer age," are malignant or become malignant. If a tumor which begins as a benign fibro-adenoma changes to a carcinoma, the change is likely to occur in spots just as an apple will rot in spots. The pathologist may not encounter these areas of beginning malignancy unless he makes serial sections of the whole tumor, but the surgeon who knows his pathology will not wait for histological examination as a guide to his surgical procedure. In other words, the surgeon should be pathologist enough to make his own operating-room diagnosis, and base his operative procedure on his own knowledge; he should combine brain and fingers so deftly and thoroughly that no guidance from without is needed. Such a position is possible only after a thorough working knowledge of surgical pathology has been acquired.

OPINION AND CRITICISM.

SOME OF THE PECULIARITIES OF OLD AGE.

The subject of old age, it would appear, is one fraught with so much importance that the medical essays thereon are limitless. Years ago when we were a younger nation than we are to-day, this matter of old age received scanty notice at the hands of medical men or medico-philosophers, for our interest lay with the strong and lusty and not with the feeble; but now that we are advanced in years—at least as years go in this country—our medical men are taking up the subject with a vim that must mean great enlightenment for all of us before long. Formerly, though old age was not the most popular subject with our purely literary men, much was written by them in a poetical and sweetly sympathetic way about the beauties of this period in our lives, about the attractiveness that comes into the winter of our existence of faltering steps and greying hair. But to-day a new aspect has been given the subject, and, even without statistics to fortify our memory, we are bold enough to say that the number of articles by medical men far outnumber those by literary essayists, with the result that we are no longer content to listen to mild pratings, but demand full knowledge so that we shall be cap-a-pie when this enemy makes inroads into our brawn and muscle.

Of the many writers who have delved into this subject, none has been so instructive, so studious of detail lest something might escape us, so insistent on emphasizing the first signs of this downward step, as Dr. I. L. Nascher, of New York. Though quite familiar with his writings, his latest contribution—at least we take it to be his latest since it is printed in the recently published "International Clinics"*— is the sort of writing that will make even he, of say fifty years or less, not only read with keen attention, but institute comparisons between the author's thought and his own failings. For instance, what reader is not going to feel the oncoming of senile mentality when he reads, "his [an old man's] loquacity betrays egotism in the exaggeration of personal attainments and achievements, and biophilism in exaggerating complaints which call for sympathy. Moral deterioration is sometimes the first indication of altered mentality. . . . He will go to a coarse theatrical show, and if found there he will denounce it and go again. He will visit questionable resorts. . . . He becomes indifferent to his surroundings, litters his desk with papers, throws scraps of paper on the floor instead of in the waste basket, and at home throws his clothes on the floor or

on a chair instead of hanging them up;" but though he shudder in anticipation of the icy finger of old age, his fears may be greatly exaggerated. We say this not because we wish to delude him in this matter, but because our own experience as well as that of others has taught us that what Dr. Nascher says is not peculiar to senility, but applies even to the comparatively youthful age of twenty. Take, for instance, the condition in which there is loquacity plus egotism and the love of life which wants sympathy in regard to complaints. Is it unusual for a callow youth to be talkative to the point of boring everyone within his reach about his attainments and achievements, and does he turn his back on sympathy extended him in his hours of exaggerated trial due to some disturbance of a bodily function? Is moral deterioration so expressive of old age that we are justified in saying that, directly this takes place, the youngish man must realize that though his body is young his mind is senile? Would coarse theatrical shows cease at once were it not for the old, and do our young men censor and condemn these by their continued absence? And who, pray, has not thrown scraps of paper on the floor, or failed to hang up his clothes, but has selected a chair for them, or been guilty of what is probably the most heinous offense in the category—thrown them on the floor? Rather untidy all this is, to be sure, but can it be said to be the outcome of senility?

There are certain features of old age that must appeal to the student of physiology who is bent on ascertaining data, but there are others that are so foreign to the subject that their mere mention invites ridicule. In fact, this matter of old age has become an obsession with some writers; an obsession that drives them to the greatest lengths when describing it. Where will this investigation stop? or is it destined to go on forever? Let us hope not; for if this were to happen, new and bewildering indications of senility would be added monthly, if not daily, to the already formidable list, and we would have nothing but old young men in this world, or "dotards at five," so graphically described by Gilbert in his "Bab Ballads."

LITERARY NOTES.

The subject of eugenics is without exception the most engaging subject of the day, and if any other is receiving greater attention at the hands of biologists, the writer of these lines is not aware of it. To improve the race! could there possibly be a higher mission, could there possibly be a subject of such magnificent ramifications? But how go about it, how buttonhole your neighbor and make him conserve his mental and physical powers so that in case of marriage, of course with the right sort of person, the offspring shall show signs of race improvement? Simplicity is no factor in such undertakings, but what has simplicity to do with the modern trend of thought. As physicians, we know the worth of the sub-

ject of eugenics, but also as physicians we know what diseases are hereditary and what diseases are not. What we do not know, and never intend to know, are the many diseases that biologists set forth as hereditary without delving deep into the subject. Having become enamored of the subject, and being most desirous for race improvement, biologists are overstepping the bounds of reason; and if one were to follow to the letter what they so positively assert, the cleansing might be admirable, but would the race show as many peaks as it has done in the past? Is it not possible that the complete stringency which they advocate may result in a mediocrity of mankind with no Stevensons, no Ruskins, no Lambs and no De Quinceys as guiding stars? Of course, the eugenists are so scientifically interested in the improvement of the whole race that they overlook so minor a matter. True, they invariably mention the Edwards family and the Jukes family; but the former, while illustrative of normal mentality, is not a case in point when the subject of genius is under discussion. Nevertheless, eugenics is really worth while; and in Charles Benedict Davenport's "Heredity in Relation to Eugenics" (Henry Holt and Company), the reader will find much to interest him. He will not only be delighted with the author's easy, flowing style of diction, but will learn much in regard to the inheritance of family traits. The chapter on The Study of American Families will also hold his attention, for it contains much that is new and much that is interesting. But what should interest physicians most in this book is the following excerpt from Chapter VIII (Eugenics and Euthenics) in which the author eugenically explains the causes of disease: "It is an incomplete statement that the tubercle bacillus is the cause of tuberculosis or alcohol the cause of delirium tremens or syphilis the cause of paresis. Experience proves it, for not all that harbor the tubercle bacillus show the dread symptoms of tuberculosis (else there were little hope of escape for any of us); nor do all drunkards have delirium tremens, nor are all who are infected by syphilis paretic, else our hospitals for the insane would be fuller than they are. Rather, each of these diseases is the specific reaction of the organism to the specific poison. In general, the causes of disease as given in the pathologies are not the real causes. They are due to inciting conditions acting on a susceptible protoplasm. The real cause of death of any person is his inability to cope with the disease germ or other untoward conditions."

———

The readers of Galsworthy's "Justice," who were won over to the author's point of view, should read "An Open Letter to Society from Convict 1776" (Fleming H. Revell Company, New York) if only to learn a further chapter on what is right and wrong in the penal code as accepted by civilized communities to-day. The majority of the books which have been written upon the criminal have emanated from penologists

and criminologists; and while it is in the order of things that those of us, who know little of the causes of crime and to what lengths crime should be punished, should be instructed by the specialists, there surely are two sides to the question, just as there are to all questions which have never been satisfactorily answered. And this is what the author of the book under consideration attempts to do; and whether or not the reader judges him right in his attitude, he cannot fail to recognize the earnestness of his plea and the sincerity of his motives. As all of us know, punishment by the State, while absolutely necessary as a castigation so that the criminal may know he cannot offend with impunity, has been most ineffective in lessening the number of offenses committed; and though the criminologists have told us repeatedly that criminality is hereditary; that the criminal is a degenerate whose mental and physical stigmata are opposed to regeneration; that the perpetration of even a slight offense stamps the man as a social derelict whose mental make-up is lacking in the qualities which go to the making of good citizenship; that environment is of such minor importance that to advance the plea, that perhaps it had a bearing on the commission of the deed, is a childish explanation; our penal laws must have some imperfections if the man, whose first offense was the stealing of money, leaves the penitentiary under the same cloud as when he began to serve his term, inasmuch as, despite the fact that he gave the State what it demanded, he remains, upon taking up his former position in society, the same criminal in the eyes of his acquaintances, and especially in the unrelenting eyes of the man who had been robbed. How all this could be remedied is the object of this book; and, as has already been said, whether or not we agree with all that the author says, we cannot but feel that he has thought out his subject neatly and concisely, and in a spirit that must evoke in the minds of all readers the thought that perhaps here is a partial solution of that vexed question, What means should be used to right the offender in the opinion of society so that he does not drift into the ever increasing class of hardened criminals?

———

Honnor Morten's "Child-Nurture: A Handbook for Parents and Teachers" (Mills and Boon, London) is a very well-written book, indeed, on a subject that is uppermost to-day in the minds of parents and teachers. The authoress has the happy faculty of presenting each subject pertaining to child-nurture in an engaging manner, and while it would be an exaggeration to call her erudite or scientific, there is such a human note on every page that praise should not be withheld. And perhaps, after all, the proper upbringing of the child is really a matter of the understandingness of the child, and not what a scientific adult mind, narrowed by special work, thinks should be done. Nature, as illustrated in the normal child, might need some curbing, but even so the leash should never be too short. Now, in "Child-Nurture," the workings of

Nature are a cult, and rightly, and the authorities relied upon for this attitude are such great exponents of "natural education" for the young as Rousseau, Tolstoy, and Amiel. Despite what has been written against Rousseau's theories in recent years, and the nonsense printed about Tolstoy in regard to his village schools, these men were not dreamers and idealists whose words were worthless, but seers who, when stripped of their exaggerations, were pioneers of such originality that the rank and file and even the so-called elect of humanity were prone to ridicule where praise should have been meted out. But a change is taking place in educational circles, and already faint whisperings are heard that our public school system is not infallible, and that perhaps the Gradgrind system, which has been so religiously followed, was really a deification of artifice and a sad neglect of Nature. If this is so—and what has been latterly stated by a few free-lances in the educational world goes to show its verity—such a book as "Child-Nurture" should have a distinguished place, not among the immortals, but on a library-shelf within easy reach of teachers and medical men who are interested in the proper mental and physical pabulum for the growing child.

———

Those strenuous workers, on behalf of the sexual education of the child, might, in their few moments of relaxation, read with some profit two little books lately translated and published by Aletheia C. Caton of London, for here they will find a delicacy and charm which are not any too often the leading qualities of their many diatribes. Hugo Salus, who wrote "Children," and Otto Ernst, who wrote "Dolls, Dead and Alive," really understand the psychology of the child far better than those educators, whose one desire seems to be to inculcate all their theories into the immature mind without much thought of whether or not the child is precocious enough to grasp their bewildering maunderings. These prose-poems are very light reading, indeed, but their lightness should not be underestimated, for between the lines is very good philosophy, the sort that any parent interested in the proper upbringing of children can grasp. And having digested the drift of thought contained in these two books, what parent will not be the better for it, what parent will not be the better guide for his children! This is a gain that no one can belittle, for it is the parent or parents of the child who should see that its mental growth is along the right lines as regards sexual matters. To relegate this matter to teachers in schools is pure nonsense, and cannot result in aught but a complete distortion of facts. But directly parents understand the psychology of their children better, and children are no longer fearful of their parents as to asking the questions which our Puritanism has heretofore tabooed, a happier state will take place, and the profit for the immature will be immeasurable. Whenever the writer of these lines hears what our educators are going to tell the child directly

sexual matters are part of the public school curriculum, he is forcibly reminded of what a certain critic said when Henry James's "What Maizie Knew" was published—to wit, Maizie knew altogether too much. Now no such danger can arise from any parent reading the books under consideration and then imparting their contents to his child, for the words, though simple, will convey considerable enlightenment, perhaps not as much as would come from an educator primed to bursting; but at least there will be this redeeming feature—the youngster will not be a sorry prig who will descant on sexual matters to the disgust of his elders.

"The Declining Birth-Rate" by Dr. Arthur Newsholme (Moffat, Yard and Company, New York) is illustrative of the fact that, contrary to accepted opinion, France does not stand alone as regards a decreasing birth-rate. In truth, all countries are guilty of this offense, if offense it be, which has been denied in certain high quarters; for though France took the initiative in this matter on account of economic reasons, even Germany, that country of fixed ideas as regards the numerical strength of its army, is no laggard to-day in reducing the number of births. Medically speaking, the prevention of conception is wrong except under extraordinary circumstances; but though this dictum should be abided by by all honest and upright physicians, there are a number of factors outside the medical field which have a bearing on normal fertility. What these are need not be detailed here, since they are known to all physicians who are willing to heed the voice of the sociologist; but one factor must be mentioned lest it be forgotten when only the medical side of the question is discussed—namely, the cost of living and the fear of poverty. The latter has been with us so long, and has been so unsuccessfully fought, that perhaps the will of the people in this instance is not without value, in that by limiting the family to two children a lessening of this evil will obtain. George Gissing, in his books descriptive of the life of the lower classes in London, shows but small sympathy for the poor, since his contention is that poverty could be somewhat ameliorated if the poor would put up a valiant fight against burdens which are self-imposed. And even physicians know the difficulty of combating disease in poverty-stricken families, the number of whose children is not commensurate with the size of the one or at most two rooms in insanitary tenement-houses.

ERRATUM.

In Dr. George Herschell's article entitled "Points in the Diagnosis and Non-Surgical Treatment of Duodenal Ulcer" in the March issue of the JOURNAL, the diet tables for the first and sixth days were transposed, the table for the sixth day as printed being the table for the first day, and the first being the table for the sixth. [EDITORS.]

ORIGINAL ARTICLES.

THE PRESENT STATUS OF THE SERUM TREATMENT FOR HYPERTHYROIDISM.

By S. P. Beebe, Ph. D., M. D., of New York.

During the last six years the writer has been using, in the treatment of hyperthyroidism, a serum developed by inoculating rabbits and sheep with the proteids obtained from human thyroid glands. The reasons for using a serum made in this way for this purpose should not be difficult to understand. The symptoms of hyperthyroidism in the human subject are caused, in a large percentage of the cases, primarily by the over-abundant secretion of the thyroid gland. It is not the purpose of this paper to enter into a prolonged discussion as to the nature of the disease; therefore, no elaborate attempt will be made to defend the principle just announced. Certain well-authenticated observations point almost incontrovertibly to such a conclusion. These observations may be summarized as follows:—

1. The gland is enlarged. It has much increased blood-supply, and histologically shows marked evidence of an increase in the total amount of secreting epithelium.

2. The symptoms of the disease, such as loss in weight, increased heart action, weakness, increased oxygen absorption, etc., can be imitated by giving to normal individuals large amounts of thyroid preparations.

3. Removal of the gland or a diminution of its blood-supply by surgical means relieves the condition, while many observations show that these patients are in most cases more than usually sensitive to thyroid administration.

The gland, therefore, is over-active. The function of the gland is not subserved within itself. The secretion prepared in the gland must reach distant organs and tissues. If the gland is over-active and an additional amount of the active secretion, which is chemically an iodized proteid, reaches, through the medium of the blood-supply, the tissues which it stimulates to unusual activity, we have the complex of symptoms which we recognize as Graves' disease. The blood in Graves' disease, therefore, must contain an unusually large quantity of the active secretion prepared in the thyroid gland. When this secretion is present in the blood within normal limits, the physiological activity alone is served.

When, on the other hand, excessive quantities are present, pathological conditions are produced.

The purpose of the serum treatment is to prepare in an alien species of animals a serum having specific antagonistic properties to the thyroid secretion. The injection of this serum into a patient having Graves' disease provides him with a ready-made antagonist to a complex toxic substance circulating in his blood.

Briefly, the serum is prepared by inoculating either rabbits (preferably Belgian hares) or sheep with nucleoproteid and globulin prepared from human thyroid glands. The inoculations must continue over a period of five to seven weeks, at intervals of about six or seven days, before the animal is sufficiently immune to make its serum have decided therapeutic value. At the end of this time the animals are bled and this serum prepared for inoculation in the usual way. After the first bleeding, the animals may be inoculated again two or three times and a second bleeding made, but it has been found inadvisable to repeat this process more than three or four times, since the quality of the serum depreciates after this experience.

During the last six years more than 2,000 cases have been treated with serum prepared in this fashion. These patients have represented all ages and stages of the disease, the youngest patient being not more than five years and the oldest over eighty.

Graves' disease, or better, hyperthyroidism is in itself an extremely complex condition. The patients have represented all the different stages of the disease, and a vast deal of space might be used classifying the various clinical and pathological conditions which have been found. The experience obtained in the treatment of this number of patients has made it possible to differentiate between the different types of the disorder in respect to their suitability for serum treatment, but for the purposes of this paper it will be sufficient to class them into three groups:—

1. Patients that have had the disease for only a short time, from two weeks to six months, in many instances in mild form, while in others very severe and acute. All the classical symptoms of the disease may be apparent or one or two of them may be lacking. An enlarged gland with some cardiac disturbance is always present.

2. In this group may be placed those patients who have had the disease for a considerably longer time. The disease has been running a more or less marked course, with occasional exacerbations, with varying degrees of severity. It is intended to include in this group the fairly typical examples of the disease that have existed for some time,—from four to eight years.

3. In this third group may be placed the so-called atypical cases, which oftentimes show very curious mixtures of Graves' disease and myxedema, and in this group may also be included the patients that have had a history of Graves' disease over a very long period of years, and

who rarely, if ever, at the time they are seen, present the typical conditions found in the early development of the disease.

The best results in treatment are obtained with patients belonging in the first group. This is true also of the surgical treatment of the disease. No one point in therapeutics is so important as an early diagnosis. If the symptoms are very mild and have appeared within a few weeks, it may be necessary to use the serum for only a short time, perhaps not more than eight or ten injections, extending over a period of two or three weeks. On the other hand, if the conditions show very severe, acute development of the disease, active treatment may be needed for a period of four to six months. The percentages of recovery and marked improvement are much better in this first group than in the two following groups. Eighty per cent. of the patients in this first group will be very much improved or cured by serum treatment.

Because serum is used as a therapeutic agent in the treatment of this disease, there should be no relaxation in the other common-sense medical measures to be employed. No sane physician would permit a patient, having a cardiac disturbance and the general physical debility often seen in Graves' disease, to be active physically. However, because such patients have no pain, and because until they reach the point of physical exhaustion they often feel very well, an amount of physical activity is allowed them, which is quite unwise and unwarranted. In the beginning of the treatment the patient should be put to bed and kept at rest for from two to six weeks. Few visitors and very little excitement should be permitted. An abundance of well-cooked food, avoiding tea, coffee, alcoholic stimulants and meat, should be provided. Such simple directions as these seem hardly necessary, and yet experience shows that they are frequently neglected.

In the second group are patients who have had the disease for a considerably longer time, and who have reached a point of being physically much more disturbed than those in the first group. The prognosis is not as good. Treatment must be continued over a longer period of time, and the final results are not as favorable. The patient is more likely to be left free from cardiac, nutritional, and nervous disturbances, but with a marked exophthalmos, or thyroid gland which has not returned to its normal size. The recovery is slower, the period of enforced rest required is longer, the heart is not as quick to regain its tone, and the reaction towards serum treatment or any other form of treatment is slower and less decided. Fifty per cent. of the patients in this group may be cured or improved to a point where they can follow the usual activities of life without discomfort.

In the third group are found patients who are most difficult to treat. Here it is that the serum treatment has its smallest application. In this group are the patients who have the marked and complex conditions so hard to reconcile with our theories of the disease. Some of the patients

show symptoms of Graves' disease and others of myxedema. There is evidence that other of the ductless glands besides the thyroid have been involved, and the direct treatment aimed at suppressing the thyroid activity, either by means of serum or by operation, is not always followed by success. Serum may not only do no good to these patients, but it may do harm, and it requires a very careful analysis of each particular case to determine whether or not the conditions that are found are probably caused by an excessive function of the thyroid rather than a diminished function or a disordered function before one can intelligently conclude to use the serum. It is useless to quote statistics upon the results obtained with serum treatment in this group of cases, because it so rarely happens that serum alone can be relied upon as the effective agent.

The serum is administered by hypodermic injection. The writer usually gives it in the upper arm, midway between the shoulder and elbow, on the outer side. The needle should be pushed completely through the skin and the serum injected into the subcutaneous tissues. The dose varies. The first dose may need to be smaller than those given later on. It is generally wise to begin with an injection of not more than 8 to 10 minims, and follow this in twenty-four hours, if the reaction has not been disturbing, with a second injection somewhat larger; and injections may be continued daily for the first three to five days, gradually increasing the size of the injection until a full tube, 15 to 16 minims, is given at each injection. These are general directions to apply to the average case. With a patient very acutely ill it may be necessary to give, during the first twenty-four hours, two or three full tubes of the serum. Following the inoculation there is likely to be an area of reaction develop at the site of the injection. This in most instances is no more than an area of redness and induration from 1 to 3 in. in diameter. This condition persists for a few hours and then subsides, so that twenty-four hours later the arm is practically in a normal condition again. It occasionally happens that a patient is extremely sensitive to the serum and shows a very marked area of local reaction. The whole arm from the shoulder to the elbow and down on to the forearm may be swollen, tense, red, painful, and have something of the appearance of an erysipelas. With a patient so sensitive as this it is necessary to proceed carefully. It does not mean that the patient cannot take the serum, but it is very unwise to inoculate a second time until the reaction of the first injection has entirely subsided. If too early an injection is made, the second reaction will be very much more active than the first one, and the first area of reaction will again develop a condition very similar to what it had at first. If the injections are repeated too soon, the reaction at each point will be very severe; the former sites of injection will all react again; the patient will have a fever, be nauseated and ill. The proper method to follow in such a case is to allow the first reaction to subside entirely, then begin with a very small dose, 2 or 3 minims, and allow each reaction to subside

before giving the one following; and in a short time it will be found that the size of the injection can be gradually increased until a full tube of the serum is given every second day without any disturbance whatsoever. So severe a reaction as that just described is not a common event. In most instances serum can be given with only a slight area of local reaction and no general disturbance. Very rarely the writer has observed a reaction which shows some of the phenomena of an anaphylactic disturbance. This occurs only very rarely, indeed, and seems to bear no relation whatsoever to the amount of serum injected, the interval between the injections, or the length of time which the patient may have had serum given. He has observed it to occur after the patient has had serum for three months at intervals of two days. The injection is followed almost immediately by a very severe pain in the back, difficulty in breathing, which may amount to a fairly marked dyspnea, swelling of the eyelids, nose, lips, ears, and marked cutaneous flushing. In two or three instances there has been a short period of syncope. These symptoms very promptly pass, and the patient is soon quite all right again; but after a reaction of this sort it is unwise to inoculate again for a period of two or three weeks. If another inoculation is made within two or three days, the same phenomena are likely to occur again, not invariably so, and it is not possible to quote a very large number of cases on this point because the reaction is so rare; but, in most instances in which injection was given again after an interval of two or three days, there has been a development of a similar disturbance, perhaps more severe than that noted at first, and it is best, therefore, to allow a period of two or three weeks to elapse before another injection is made and then to start in with a small dose, not more than 3 or 4 minims. In one patient such a reaction occurred at three different times, without previous warning, at intervals of about two months. In most cases, however, absolutely no difficulty will be experienced in the administration of the serum.

The length of time which the serum will need to be continued depends a great deal upon the character of the case. The cases that are treated very early in their development may need to have serum given only for a period of three or four months, while in others that have existed for a longer time it may be necessary to give serum for eight, ten or twelve months. One point it is very necessary to bear in mind, and that is that after the patient has been restored to apparent health it is not safe suddenly to stop the injection. The interval between them must be gradually increased until finally an injection is given once every eight or ten days, and it may be necessary to keep up the treatment at this interval for four or five months before it is safe to allow the patient to go free entirely. If the treatment is interrupted when the patient has made very satisfactory improvement and is apparently well, the good conditions are likely to continue for six or eight weeks, and then show a gradual return of the disease. A redevelopment of the symptoms means that serum must be

given again immediately, and a relapse is in most cases readily controlled by this means, but it sometimes happens that a relapse is much more difficult to control than a primary attack.

In this brief review only a summary of the situation can be given, but it is the writer's belief, and in this opinion he is confirmed by a large number of experienced clinicians who have had considerable experience in the administration of the serum, that we have a very valuable addition to the therapeutic possibilities in the treatment of hyperthyroidism.

Again the writer wishes to emphasize the importance of an early diagnosis. Any patient who is nervous and has a pulse-rate considerably above normal is entitled to a very thorough examination even in the absence of an apparent thyroid enlargement or exophthalmos. A patient with marked exophthalmos rarely goes without diagnosis, but this symptom is by no means a necessary one.

In addition to the use of serum, the physician should use his medical judgment and not expect that a seriously ill patient with hyperthyroidism is going immediately to recover a normal condition of health when she is allowed all the degrees of activity, social, physical and mental, which obtained during the development of the disease. No physician would permit a patient ill with diphtheria to be up and about merely because diphtheria antitoxin is a valuable therapeutic agent and has been given at a time and in a quantity sufficient to produce a favorable outcome. The serum should be used as an agent to help in the control of the disease, but it must be remembered at the same time that these patients are really sick and need to be treated as sick persons, if a favorable outcome is to be expected.

414 E. 26th Street.

WHAT IS INTERNAL SECRETION?*

By Eugene L. Opie, M. D., of St. Louis.

In the popular textbook of physiology by Michael Foster, published in 1891, the functions of the thyroid, the pituitary, the suprarenal bodies and the thymus are discussed in a chapter entitled "On Some Structures and Processes of Obscure Nature." These, he says, differ from each other so essentially that the only plea which can be urged in favor of considering them together is convenience and our ignorance of their respective functions. This statement well describes knowledge of the so-called ductless glands at the time it was written, twenty years ago. Although knowledge of the thymus is to-day no more precise, experiments on animals have defined with considerable accuracy the functional disturbances which follow disease or removal of the thyroid, pituitary body, and adrenals, and the experiments of Gley, begun in 1891, have added to the group another vital organ, the parathyroid.

In the same year, 1891, Brown-Séquard used the term "internal secretion" to describe hypothetical products formed by the parenchymatous cells of an organ and discharged, not into the duct of a gland, but into the blood-vessels in contact with the cells of the part. Present views concerning so-called internal secretion are in great part based upon the discovery that certain organs which possess no duct, but are composed of cells resembling those of glandular organs, exert functions which are essential to normal metabolism. These ductless glands can affect other organs only by way of the blood-stream.

It is assumed that such internal secretion is the specific product of cells which form the thyroid, adrenal or other organ. It is well recognized that one organ which possesses a duct and furnishes an external secretion—namely, the pancreas, exerts through the blood an influence upon the assimilation of carbohydrates; in the absence of the pancreas, sugar appears in the blood and glycosuria follows, but it is scarcely possible to define in more precise terms, the nature of the influence exercised by the pancreas. It is usually assumed that the organ furnishes some product which favors the consumption of sugar by the tissues of the body. There are in the pancreas, it is well known, minute ductless structures with a rich vascular supply, the so-called cell islands; many have found proof that they control carbohydrate metabolism, whereas others maintain that the internal and external functions of the pancreas are dis-

---

charged by the same cells. An internal secretion has been assigned, on somewhat dubious grounds, to other glands which are provided with a duct, for example to the kidney, and a somewhat similar problem is presented by the testicles and the ovaries. The influence of these organs on the development of sexual characters has long been known—but there is still doubt whether this influence should be assigned to the peculiar cells of the organ or to certain special cells which occur within its connective-tissue.

With present knowledge concerning the diverse influences which various organs exert upon other tissues of the body, it is scarcely possible to define with precision what phenomena should be placed beside those which characterize the so-called ductless glands; in other words, what should be described as evidence of internal secretion. It is noteworthy that the term was employed by Claude Bernard in 1855, many years before it was reintroduced in its modern sense. The discoverer of glycogen, describing the functions of the liver, distinguished the external secretion of bile by way of the bile-ducts from what he called the internal secretion of sugar into the blood. Many organs of the body modify various food substances so that they may be assimilated by other tissues, and all tissues discharge waste products into the blood. Such processes should not be designated internal secretion, for the term then loses much of its convenience and is no longer limited to those changes which have their type in the ductless glands.

The functions of various organs are brought into correlation by two important means: First, by the nervous system; second, by substances formed by one tissue and carried by the blood-stream to other tissues whose functions are modified thereby. The term hormone has been introduced by Starling to describe a substance, which formed in one organ, controls the function of another. He applied the term to secretin which is elaborated in cells of the duodenum under the influence of acid, and hence carried to the pancreas excites the secretion of pancreatic juice. Edkins has described a similar hormone for the gastric juice. Zuelzer has recently prepared, from the stomach, a substance which excites active peristalsis of the intestine, and this body, which he calls hormonal, has received much attention as a possible remedy for constipation. No line can be drawn between such products and so-called internal secretions; adrenalin is a hormone in accordance with present usage.

No subject in medicine better illustrates the relation of clinical medicine, pathological anatomy and technical research. In the absence of accurate post-mortem observation, clinical medicine has little opportunity to progress beyond the level maintained during the Middle Ages when bodies were not opened. Clinical observations, given precision by anatomical examination, have furnished the problems which can be solved only by experimental methods.

Cawley found disease of the pancreas associated with diabetes mellitus

more than a hundred years before von Mering, and Minkowski showed that extirpation of the pancreas in animals is followed by fatal diabetes. Addison's disease, described in 1855, attracted attention to the functional importance of the adrenal gland, and, in the following year, Brown-Séquard showed that extirpation of the glands is fatal to animals; yet, insight into the probable functional activity of the adrenal was not obtained until Shaffer and Oliver discovered the power of extracts of the adrenal of elevated blood-pressure.

Reverdin and Kocher noted the occurrence of both myxedema and tetany following operative removal of goitres, but a clear understanding of the functional importance of the thyroid was not obtained until the experiments of Gley showed that the removal of parathyroid bodies is followed by fatal tetany. Acromegaly, described by Marie in 1885, first attracted attention to the importance of the pituitary body; and only in the last few years have experimental methods been so perfected that they have thrown light upon the functions of the organ.

Knowledge of the functional activity of the thyroid, parathyroids, adrenals, pituitary, and pancreas are based on several kinds of experiments:—

(1) Those in which the organ has been extirpated with the purpose of determining the effects of its removal and of bringing these disturbances into harmony with the conditions found in patients with disease of the organ.

(2) Experiments in which removal of the organs has been followed by attempts to replace its influence by the injection of extracts of the same organ. The therapeutic application of results so obtained is obvious.

(3) Experiments to determine the pharmacological effects of extracts of the organ. Adrenalin is a noteworthy result.

(4) Effort to demonstrate, in the blood of patients or of animals, substances having the properties of extracts derived from an organ, that is, to demonstrate in the blood an internal secretion derived from it. Attempts to obtain such direct evidence of internal secretion meet many difficulties which are not yet overcome.

Much evidence concerning the effects following extirpation of the organs under consideration has been accumulated; but, for the pancreas alone, there is definite knowledge of the changes in metabolism following loss of the gland. Diabetes mellitus reproducing all the characters of the disease in man follows extirpation of the organ; yet this disturbance of metabolism cannot be prevented or even favorably influenced by administration of extracts prepared from the pancreas. Extracts of pancreas have had no success in treatment of human diabetes. Observations of Cohnheim for a time appeared to explain in part this discrepancy, since they indicated that the pancreas furnished only one of two substances concerned in the disintegration of sugar in the body, the muscles

furnishing the second. An extensive controversial literature has followed this publication, but recent studies of Levin and Meyer suggest that Cohnheim's experiments fail to demonstrate a sugar-splitting enzyme, and fail to aid in explaining the fate of sugar in the body.

Experimental observations upon the effects of extirpation of the thyroid gland are in accord with clinical observations upon myxedema and cretinism, and it is now recognized that loss of the gland in adults brings about disturbances of nutrition with cachexia and a so-called myxedematous condition of subcutaneous and other tissues, whereas the same injury in growing animals is associated with a retardation of growth affecting the bones and other tissues. It is well known that the defect which follows removal or disease of the thyroid gland may be supplied by administration of extracts derived from the thyroid gland of lower animals. The therapeutic control of myxedema and cretinism is rightly regarded as one of the triumphs of modern medicine. Nevertheless, precise knowledge concerning the function of the thyroid and the method by which it exerts its influence on metabolism is wanting. So-called hyperthyroidism, artificially produced by administration of extracts of thyroid tissue, causes increased consumption of protein and other substances in the body, as shown by increased excretion of nitrogen together with evidence of more active oxidation indicated by increased intake of oxygen and increased output of carbon dioxide.

It is assumed that the cells of the thyroid form a substance which is essential to the normal activity of other tissues. Asher and Flack have made numerous experiments which indicate, they believe, that stimulation of the laryngeal nerves hastens the formation of the active principle of the gland. Many observers have found evidence that the thyroid gland destroys some poisonous substance, which is formed perhaps as a waste product by various tissues and accumulates in the blood when the thyroid is removed. This view is supported at first sight by observations of Hunt which have recently attracted much attention. Mice fed with thyroid are found to exhibit increased resistance to poisoning with a derivate of prussic acid known as acetonitril. Hunt discards the view that his experiments indicate a poison-destroying function, for susceptibility to morphine may be increased by the same means.

Experiments on animals have shown that the parathyroid bodies, whose weight is a minute fraction of the weight of the body, are vital organs. The danger of operations on the thyroid is greatly reduced by the knowledge that the fatal tetany, observed by the surgeons who first attacked goitres, does not occur when all of the parathyroids are not removed. Halsted has seen tetany prevented by a parathyroid graft $\frac{1}{4}$ mm. in diameter. Extracts of the parathyroids prevent the symptoms of parathyroidectomy. Yet, in spite of the advances which have followed the experimental study of these organs, their part in the economy of the body is still obscure. Studies of MacCallum and Voegtlin have attracted much attention to the influence of the parathyroids upon the

calcium content of the various tissues of the body. They have found that the administration of calcium salts stops the tetany which follows parathyroidectomy. Finding that the calcium content of the tissues, es-They cite similar observations made by Netter, who found that calcium by the urine is increased, they conclude that the removal of the parathyroids produces changes which favor the elimination of calcium. They cite similar observations made by Netter, who found that calcium controlled the convulsions of infantile tetany. Cook, however, has failed to find an increased calcium elimination when the parathyroids are removed, and Carlson has made somewhat similar observations.

The pituitary, like the adrenal, consists of two parts—one composed of epithelial cells, the anterior lobe; the other, in intimate relation with the nervous system, the posterior lobe. Removal of the pituitary body is accomplished with great difficulty, and the early observers, among them Horsley, basing their observations upon incomplete removal, formed the opinion that extirpation was followed by no noteworthy disturbance. The experiments of Cushing in collaboration with Reford, Crowe and Homans have recently attracted attention to the subject in this country. Complete removal of the anterior lobe is fatal within from several days to three weeks; young animals surviving longer than old. Transient glycosuria, motor disturbances, and diminution of body-temperature characterize the condition. Partial removal of the hypophysis in young animals leads to persistent infantilism with absence of secondary sexual characters; in older animals, the same operation is followed by a tendency to obesity and reversion to an infantile type, indicated by atrophic changes in the external genital organs. Observations just published by Benedict and Homans from the Nutrition Laboratory of the Carnegie Institution show that the activity of total metabolism measured by the discharge of carbon dioxide from the lungs is retarded. They suggest that inert body-fat accumulates because oxidation is impaired. Other illustractions of the sluggishness of vital processes following the operation are the slowed pulse and respiration, and depression of body-temperature.

A similar condition has been observed in patients suffering with tumors which have compressed and destroyed the pituitary body. Excessive accumulation of fat, absence of secondary sexual characters, glycosuria, subnormal temperature and slowing of pulse have been observed.

In view of these observations it is surprising to find that extracts of the anterior lobe of the pituitary are inert, whereas those from the posterior lobe raise blood-pressure and cause glycosuria. Cushing and Gœtsch have recently found that removal of this part of the organ is followed by increased tolerance for sugar so that unusually large quantities can be administered without the production of glycosuria.

It is unnecessary to discuss the effects of removal of the adrenals, which like the structures previously considered are vital organs, nor the relation of these changes to the symptoms of Addison's disease, nor the unsatisfactory results of its treatment with extracts of the adrenals. In

adrenalin, characterized by the properties discovered by Oliver and Shaffer in adrenal extract, and identified as a definable chemical compound by Abel and synthetized by Dakin, we possess an active pharmacological principle derived from the medulla of the adrenal. Its effect on blood-pressure and its therapeutic value are well known. There is some direct evidence that adrenalin, or a very closely related compound, enters the blood of the adrenal; that is, this compound is not merely a substance with active pharmacological properties extractable by certain procedures, but is a product of secretion. Dreyer made the claim more than ten years ago that the blood of the adrenal vein, drawn from an animal whose splanchnic nerve had been stimulated, possessed greater power to elevate blood-pressure when injected into a second animal than blood from the adrenal vein of a normal animal. The evidence, that adrenal secretion like the secretion of the salivary and other glands is formed in response to nervous stimulation, has been confirmed by Tscheboksaroff.

Various methods have been proposed to demonstrate the presence of adrenalin in the blood and even to measure its amount. Chemical tests are impracticable in view of the minute quantities concerned; biological methods, dependent upon the power of adrenalin to stimulate the contraction of strips of smooth muscle from lower animals, have been employed. Such methods have suggested the possibility that high arterial tension in nephritis and other diseases is due to alterations of adrenal activity, but much doubt has been cast upon their value by O'Connor, who has shown that blood-serum produces changes absent with blood-plasma, and by Stewart, who has been unable to harmonize the results of different methods applied to the same blood.

Study of organs of internal secretion has stimulated investigators to delve into all the inaccessible nooks of the body. Muenzer has recently reviewed the pathology of the pineal gland and describes the effect of hyper- and hypo-pinealism and the cachexia following total destruction. Exner and Boese, on the other hand, claim that rabbits survive removal of the pineal body without injury.

Experimental studies upon lower animals have established the relation of myxedema and cretinism to disease of the thyroid gland, and have shown that post-operative tetany may be avoided by sparing the parathyroid glands. They have shown that the pituitary body is essential to life, and have defined the symptoms which occur when it is destroyed. They have furnished adrenalin, a substance with active pharmacological properties and numerous therapeutic uses, and promise to furnish other organ extracts of similar value. Much has been learned concerning the function of the ductless glands, but we are, as yet, ignorant of the means by which they exert their vital influences, now fully recognized. Until this knowledge is acquired, we can scarcely hope for an intimate understanding of diseases such as acromegaly, exophthalmic goitre and diabetes mellitus.

INSIDIOUS CHRONIC APPENDICITIS.

By M. J. LICHTY, A. M., M. D., of Cleveland.

Appendicitis is such an old subject that it might seem that one ought to apologize whenever opening a discussion of this disease or even any feature of it. But such an apology is hardly necessary. The history of the first observation of the pathology of appendicitis, and the first recognition of some of its symptoms, and the first attempt of its treatment by operation, as well as the sharp and often bitter discussions by surgeons and physicians about its medical or surgical indications, are all matters of interesting reading or observation.

Fortunately the medical profession as well as the laity is now convinced that the attack of acute appendicitis—that feature of the disease which was almost the only feature at first recognized—is almost invariably a surgical condition.

The chronic appendicitis with many of its mild attacks, following the primary, severe, and dangerously acute attack, was next to be recognized. Later still chronic insidious appendicitis, without any previous acute attack, but with the rather typical symptoms of discomfort and pain about the seat of the appendix, has been recognized and diagnosed with remarkable frequency.

The writer wishes now to call your attention to that form of insidious, chronic appendicitis where the patient notices but little or no pain or distress in the appendix region, and where the diagnosis has to be made by symptoms and physical signs which the patient and even the physician are too prone to consider as evidence of disease in other organs, without recognizing the underlying cause, and without appreciating the reflex influence which the chronically diseased appendix has upon these organs. This form of chronic appendicitis with few or no pathognomonic signs to indicate it is no doubt very frequently and easily overlooked. In appendicitis, as in many diseases of other organs, the failure to recognize the significance of remote symptoms and physical signs has often led to an erroneous diagnosis with unnecessary and prolonged treatment of other organs which were perfectly healthy.

How then may one make the diagnosis of this form of appendicitis, and what symptoms and physical signs may exist anywhere in the body which would lead one to a proper and safe diagnosis?

Before attempting to indicate these symptoms and signs, brief reference to personal experience with a few cases must be made.

CASE I.—In April, 1910, there came under observation a lady of fine physique, who said that she had never been seriously ill except for a supposed gastric

ulcer two years before. She said blood had been found at that time in her gastric contents and feces. A six weeks' rest-cure helped her very much, but six months later the symptoms recurred, and as no blood was found in feces and stomach-contents she was accused of being neurotic. This opinion she regarded as slanderous; hence she did not consult a physician for two years thereafter. When first seen she complained only of nausea, belching, pyrosis, and some constipation. Physical examination was practically negative except for a little albumin and some pus and blood in the urine (appendicular nephritis, to use Dieulafoy's expression), and there was tenderness in the left hypochondrium. Repeated examinations made during a period of two months revealed at times a slight leucocytosis, some tenderness over the appendix occasionally, at other times tenderness over the gall-bladder only. Then again no tenderness either over the gall-bladder or appendix, but pain in the left side of the abdomen and nausea produced by pressure over the appendix or gall-bladder. The gastric contents were free from blood and normal except for a hyperacidity. There was no blood in the stools. After ten weeks' observation an exploratory incision was advised. The operation revealed a hard, long, and chronically diseased appendix and several big gall-stones which were removed. The patient made a nice recovery, and her stomach does not bother her any longer. At the time of operation her stomach and duodenum were carefully examined through a rather long abdominal incision, and not a sign of a scar or old ulcer could be found anywhere.

CASE II.—Another case of chronic appendicitis in which the diagnosis could have been easily overlooked was that of a lady, tall and slender, aged twenty-seven. She was never seriously ill, though she had stomach trouble for years, and her malnutrition was marked. Nine months before she came under observation she had been treated for a gastric ulcer, and was kept in bed the greater part of a month. Her only symptoms carefully elicited were weakness and distress in the stomach one-half to one hour after meals; a distress which was not relieved by water, food, or alkalies. There was also a constant dragging sensation in the back and right loin. Repeated examinations revealed a right floating kidney of the third degree, more or less constant tenderness over the appendix, slight dilatation of the stomach, a gastric hyperacidity, and an occasional slight increase of the number of leucocytes. Several examinations were made of the feces, but occult blood was found only once. A diagnosis of duodenal ulcer or chronic appendicitis with floating kidney was considered. At operation the kidney was fixed into position, the appendix was found diseased, enlarged and hard with strictures, and twisted upon itself so that the contents of the appendix could not be expelled. The stomach was examined carefully, and no evidence whatever of former ulceration could be found. The patient has made a fine recovery.

CASE III.—Seven years ago a man, *æt.* thirty, was first seen. He sought consultation mostly on account of a varicocele, but he also complained of frequent headaches, pain in legs and thighs, constipation, nausea at times, and frequent distress at any hour after meals. These headaches and gastro-intestinal symptoms, a constant heavy coating of the tongue, together with a tendency to catch colds easily, brought the patient frequently under observation. During the last three years tenderness and a slight rigidity of the muscles over McBurney's point was frequently found; a slight leucocytosis was often present. The pains in his legs, arms and back aroused suspicion of lues in spite of a rather negative history; and mixed treatment, which was continued for a sufficient time, was instituted. When the patient was told more than two years ago and often since that his pains were likely the result of a chronic toxemia from chronic appendicitis, he frequently showed his doubts about such a diagnosis, and it was

surprising that he did not seek other professional opinions. His constant and strongest argument against such a diagnosis was the fact that he had no pain over the appendix. About six months ago this patient was taken with sudden pain in the abdomen and right groin, and very rapidly developed symptoms and signs of a severe acute appendicitis (the first acute attack), which demanded immediate operation of a pustular appendix. His speedy recovery was surprising, and the relief of symptoms most gratifying.

CASE IV.— A patient, *aet.* twenty-six, first seen five months ago, stated that he was sure his very aggravated attack of hay fever the past summer and medicines taken to relieve it had upset his stomach. He complained only of cold hands and feet, belching, pyrosis, nausea ever since last spring and now very persistent and annoying, frequent vomiting at any hour of the day and often before midnight. The distress in the stomach after meals was at times painful, and was not relieved by any food or water, or by vomiting. The bowels were normal, and there was never any pain in the lower abdomen. The first examination showed some tenderness and rigidity over the appendix and a positive zone test. Six leucocyte counts were made and gave a constant increase in the number of white corpuscles. The gastric contents were practically normal and free from blood. As the patient began to complain of pain later on, operation was advised, and a very long appendix, full of fecal concretions, was easily removed. Excepting the gangrenous and perforated appendixes it was one of the most dangerous looking appendixes one could behold.

CASE V.—A mother, *aet.* thirty-four, was told by her attending physician that she needed repair of the cervix and perineum. She rather doubted the wisdom of this advice as she complained of absolutely nothing but some anorexia and constipation with much headache. Physical examination showed, in addition to lacerations of the cervix and perineum, a slight leucocytosis, bile in the urine, and conspicuous (and surprising to the patient) tenderness and rigidity over the appendix and gall-bladder. As a plastic operation upon the cervix and perineum was agreed upon, it was advised to make an exploratory abdominal incision. The appendix was firmly fixed with adhesions which formed a band around its distal end interfering with its circulation. In the extreme end of the appendix beyond this band of adhesions was a big fecal concretion. In this case there was a most favorable condition for the development of the acute, dangerous, perhaps fatal attack of appendicitis at any hour of the night or day. Such an appendix could be compared to a dynamite cartridge in a man's house, ready to explode at any time.

CASE VI.—A woman, *aet.* forty-one, had a good personal and family history. She was first seen in March, 1911, at the suggestion of an oculist, and complained mostly of a severe and most constant headache of three months' duration. She said she slept poorly, had a bad taste in the mouth, was slightly constipated, and was nervous and irritable. During several months' observation, while medical treatment was unsuccessful the following conditions came to notice. She had a marked gastric hyperacidity without blood in the stomach-contents. The urine frequently contained a trace of albumin and some colon bacilli. Several times there was an increase in the number of white corpuscles. There was a laceration of the cervix and retroversion of the uterus. And at most of the examinations there was noticed some tenderness and rigidity over the appendix and gall-bladder. Repair of the cervix and an exploratory abdominal incision were advised. After the cervix was amputated and the uterus suspended, the surgeon found many adhesions about the chronically diseased appendix which was removed. She also had an enlarged gall-bladder containing two gall-stones which were removed and necessitated drainage of the organ. This case has made a fine recovery. There is very little doubt that the headaches, which have now ceased, were of toxic origin.

These 6 cases of insidious chronic appendicitis, which had but few or no pathognomonic signs, have not been selected because of any particular significance or on account of extreme rarity. Scores more of similarly interesting conditions or cases could be reported.

But few of these patients who have this type of the disease have any symptoms whatever which would make them suspicious of appendicitis; hence they seek the advice of a physician rather than that of a surgeon. Very many of them consult the stomach specialist on account of symptoms referred to the stomach. But the stomach is not the only organ the function of which is disturbed by this form of chronic appendicitis. The truth of this statement is emphatic and can be verified by the mere study of the cases just reported. And a report of even these few cases warrants a brief discussion of the manner in which this diagnosis may be made, and the conditions which must often be studied for a considerable time. For this diagnosis it will be found quite helpful to study any or all of the following groups of six features or physical signs which this condition will eventually produce.

Stomach.—First and perhaps most frequently these patients complain of "stomach trouble," and if the symptoms and physical signs and the analysis of the test-meal do not point clearly toward ulcer of the stomach or carcinoma, or stricture of the pylorus, and if there is an absence of lactic acid, little or no blood in the stomach-contents and an acidity which is not far from the normal, then one should hesitate very much to diagnose a gastric lesion, and ought to study the condition of the appendix continuously, carefully, and repeatedly. Here the stomach specialist must be careful to avoid a hasty diagnosis of a gastric lesion or neurosis without any consideration of the influence of the appendix.

Paterson, of London, only a few years ago expressed his surprise at the frequency of gastric symptoms and, in his experience, even the change of gastric secretions caused by chronic appendicitis. In his experience he found that the many symptoms of gastric ulcer and even gastric hemorrhage were caused by appendicitis and cured by an appendectomy instead of an operation on the stomach. He said that a "combination of marked symptoms of gastric ulcer with a negative gastric analysis is suggestive of chronic appendicular disease," and that "in recent years it is becoming gradually recognized that hematemesis accompanied by pain and vomiting is not pathognomonic of gastric ulcer."

Moynihan has said that "the typical gastric ulcer in the medical textbook is frequently the appendix." Such statements made by learned men of wide repute could not be made without good reason, and these statements confirm much personal experience. Hematemesis and considerable blood in the test-meal and feces, which was not found again after an appendectomy for chronic appendicitis have been seen quite frequently, and just as surprisingly.

A detailed report could be given of two cases that unfortunately had

a gastric ulcer and pyloric stenosis and were relieved of symptoms by a gastro-enterostomy. They made a very satisfactory recovery and enjoyed good health for several years thereafter. But finally gastric symptoms returned, and the patients were much discouraged on account of pain in the stomach, distress after meals, and hematemesis. In both these cases the symptoms were again relieved after a cautious diagnosis of chronic appendicitis and an appendectomy.

Dieulafoy has called attention to the occasional "black vomit," a profuse hemorrhage from the stomach in the somewhat more acute forms of appendicitis. Clinical observations and experimental work on dogs have convinced the writer that the diseased appendix may cause many symptoms of the stomach and greatly influence the gastric juice and acidity in different ways. Thus the appendix ought always to be considered in most of the chronic disorders of the stomach. The prolonged loss of weight associated with chronic dyspepsia, chronic indigestion, or catarrh of the stomach, is often restored after the appendix is removed.

Toxemia.—The second marked feature to be observed in this form of chronic appendicitis is the rather constant or recurrent evidence of systemic toxemia, whatever that may prove to be eventually. These patients have headaches, complain of lethargy, and express their feelings with the indefinite term "biliousness." Sometimes they are constipated. Cases have been seen where there was an annoying vertigo, or distress over the heart and palpitation, most likely produced by distention of the stomach with gas. The pulse is sometimes slow, but at other times accelerated and irregular, especially if there be half to one or one and a half degrees of temperature, which is found occasionally when not at all expected.

Blood.—The third feature to be mentioned is the condition of the blood. When the patient is a little more below par than usual, and when he is most likely to call for the physician, one may be surprised to see the constancy with which he will find, by routine examinations of the blood, an increase in the leucocytes from 10,000 to 15,000. This leucocytosis is sometimes not present for months, but then it reappears for an equal number of weeks or months. A leucocytosis of 10,000 or more demands some explanation.

Pain, Tenderness and Rigidity are considered the fourth feature. Chronic appendicitis very frequently exists without any pain or with such slight and infrequent pain that it is entirely overlooked by the patient. Many patients who know something about appendicitis are unwilling to admit a history of an occasional or frequent, slight or severe pain in the right groin. They may have forgotten about it or thought it was the result of gas in the bowels, constipation, or an indiscretion in diet; therefore the physician must often wait for weeks before he can complete his history of the patient's previous condition. Sometimes the patient intentionally denies (prevaricates about) the existence of pain then or at any time before. But in many cases pain has actually never

been noticed. With pain or without it, however, may be associated tenderness and rigidity.

A constant muscular rigidity of one or both recti muscles even in nervous individuals, when associated with other signs under discussion, must always be considered. Even when muscular rigidity does not exist, the occasional tenderness or pain on deep and firm pressure over a considerable area about the appendix must not be disregarded. The pressure over a diseased appendix which does not hurt at all, but causes some pain in the left side of the abdomen or more particularly over the stomach, and occasionally nausea, is a very important sign so long as it exists. Unless the signs of pain, tenderness, and rigidity, no matter how infrequent they are, disappear eventually and permanently, chronic appendicitis is likely to exist. A suspicion about appendicitis has in a few cases grown to a conviction after a rather severe, deep, firm, and even rough palpation of the appendix area which at that time was free from pain and tenderness, but later in the day or early the next morning was so tender that it could hardly be touched.

Zone Test.—The fifth sign, rather valuable and frequent is the Head zone test, easily and quickly made. While a negative test is of no significance, the frequent positive test has considerable significance. If there is neither pain nor muscular contraction when one draws the point of a pin, or even a blunt-pointed instrument in various directions over the abdomen, the sign is negative; but the sign becomes positive and of significance when the moving point produces some pain or quick muscular contraction repeatedly at any certain spot at that time of examination.

Dieulafoy makes the same observation by stroking the abdomen slowly with the tip of his finger instead of with a pin. A few very conservative observers have thought they could occasionally locate the position of the appendix by this test.

Chronicity.—Last of all the writer believes chronicity itself must be considered. When there are any symptoms whatever of chronic gastrointestinal trouble associated with any one of the last four signs named (toxemia, leucocytosis, pain or tenderness, and the zone test), then one must be very careful before excluding this diagnosis.

A prolonged, frequently recurrent case of colica mucosa has been seen and relieved by the removal of a big appendix of the interstitial type. Whether the colitis produced the appendicitis, or the appendicitis the colitis, is a matter of conjecture only; but that the colitis disappeared after the operation is a matter of fact and satisfaction.

While the six groups of physical signs or symptoms which have been discussed may prove invaluable in the diagnosis of this condition, it is well to remember that some of these signs will become apparent only after prolonged, diligent and patient search for them. Other signs of perhaps equal importance may be as frequent and trustworthy for other diagnosticians. It is perhaps well to repeat that most of these cases seek

the advice of a physician rather than that of a surgeon; and the statement that the diagnosis of insidious chronic appendicitis is easily overlooked is not made as a criticism of the profession. The writer is sure that he has at previous times treated cases medically which should have been referred to the surgeon.

The only way by which to prevent the acute attack of appendicitis, which is perhaps after all only an acute exacerbation of a pre-existing chronic appendicitis, much more frequently unobserved than physicians and surgeons have stopped to consider in the last two decades, is to remove the appendix after a cautious and conservative diagnosis of the insidious chronic appendicitis.

1803 East 82nd Street.

CLINICAL INDICATIONS FOR MAJOR OPERATIONS ON THE TEMPORAL BONE AND THEIR PATHOLOGICAL INTERPRETATION.

By Eugene T. Senseney, M. D., and Louis K. Guggenheim, M. D., of St. Louis.

PART I.

CLINICAL INDICATIONS.

By Eugene T. Senseney, M. D.

This article is written primarily for the general profession; hence many technicalities, which would appeal only to the specialist, have been omitted. We have endeavored to give a clear practical statement of the indications for major surgery of the ear, which will be of actual benefit to the general practitioner. Furthermore, by means of pathological specimens, we shall endeavor to prove that these indications are just, and that we have not exaggerated the dangers of aural suppuration. We shall pay particular attention to the recent remarkable advances in the diagnosis and treatment of intracranial complications and labyrinthitis. We will show that the recognition of labyrinthitis is of essential importance to the family physician.

The operations to be considered are:—

(1)   The Simple Mastoid Operation.
(2)   The Radical Mastoid Operation.
(3)   Operation for Thrombosis of the Lateral Sinus.
(4)   Operations for Brain Abscess and Meningitis.
(5)   The Labyrinth Operation.

The Simple Mastoid Operation.

The simple mastoid operation consists in the opening of the antrum and its accessory cells, and the removal of all necrotic material. As these air-cells are not always confined to the mastoid, but may extend into the zygomatic, squamous, and petrous portions of the temporal bone, and as acute inflammation of the mastoid is often complicated by periostitis of the inner cranial table, the simple mastoid may at times be a very extensive operation. The simple mastoid is also used as the preliminary procedure in operations for cerebellar abscess, thrombosis of the lateral sinus, and extradural abscess.

The mastoid process is always involved in acute suppurative otitis media. It is only necessary to interfere surgically when the products

of inflammation and swelling of the mucosa have blocked proper drainage. Prolonged retention results in the following symptoms: Pain, redness, swelling, edema, tenderness on pressure over the mastoid, and in some cases sagging of the posterior superior wall of the external canal. Where there is necrosis we may find a post-auricular abscess, fistulæ opening into the external canal, and abscess in the side of the neck (Bezold's abscess). The necrosis may extend inward and lead to extradural abscess, perisinuous abscess, sinus thrombosis, labyrinthitis, meningitis, and more rarely to brain abscess. Where drainage is good, the mastoid involvement may only be shown by the tendency of the acute suppuration to become chronic.

The simple mastoid operation is then indicated when

(1) Caries of the bone is shown by the presence of fistulæ or depression of the roof and posterior bony wall of the external canal.

(2) The pain and swelling over the mastoid process do not quickly recede after the application of ice compresses, paracentesis, etc.

(3) There are symptoms of an intracranial complication.

(4) There is a foul, thick, purulent discharge, and a tendency toward chronicity of the acute suppurative otitis media in spite of all other therapeutic measures, including correction of disease in the nose and pharynx.

The Radical Mastoid Operation.

In the radical mastoid operation, the posterior bony wall of the external canal and the major ossicles are removed. By this procedure the tympanum, external canal, mastoid antrum, and remainder of mastoid process are all thrown into one common cavity. The cellular structure around the mouth of the Eustachian tube is destroyed, and the tympanic end of the tube curetted in order to produce permanent closure. This is followed by a plastic on the membranous external canal, whereby the common cavity is later epidermitized.

It should be understood that the term "radical" does not refer to the amount, but to the location of the material removed. It is quite possible for a "simple" mastoid to be much more extensive than a radical operation and still remain a "simple" mastoid, unless the posterior bony wall of the canal, the two major ossicles and the drum membrane are removed, and a plastic performed.

The indications for the radical operation arise chiefly in the course of chronic suppurative otitis media; although under certain conditions this procedure is indicated in acute suppuration. If this paper should only serve to convince members of the general profession of the positive dangers of chronic aural suppuration, its authors will consider the time expended well worth while. In Part II of this paper will be shown how weak are the barriers between the aural suppuration and fatal intracranial disease.

The radical mastoid operation is immediately indicated in cases of chronic suppurative otitis media where there exists:—

(1) Definite caries of the temporal bone. Under this head are included cases of chronic suppuration with marginal perforation and cases with fistulous tracts opening into the posterior wall of the external canal or upon the outer surface of the mastoid process.

(2) Extensive degeneration of tympanic mucosa. Cases where the discharge contains flakes or masses of cast-off epithelium; cases with polypi and polypoid granulations, which recur after removal.

(3) Cholesteatoma. In cases complicated by cholesteatomatous formation we have marginal perforations filled with the cheesy epithelial material, which when removed shows microscopically cholesterin crystals.

(4) Pus retention. Cases in which there have occurred repeated acute exacerbations with pain, and symptoms of acute mastoiditis.

(5) Stenosis or atresia of the external canal. Under this heading we may include acute suppuration of the middle ear as well as chronic suppuration as an immediate indication for the radical operation. It is self-evident that the simple mastoid is not indicated in such cases.

(6) Facial paralysis.

(7) Intracranial complications and labyrinthitis.

(There are a few other indications, such as foreign bodies, new growths, etc., which it is hardly within the purpose of this paper to include.)

The aforementioned conditions and their combinations belong to those cases of chronic suppuration where the danger of serious intracranial complications is imminent. With caries of the temporal bone the patient is in constant danger of extension of the suppurative process to the labyrinth, meninges, lateral sinus, and brain. This danger is further increased where there is extensive disease of the tympanic mucosa, on account of the resulting faulty drainage and added danger of pus retention. The gravity of the so-called "cholesteatoma" cannot be exaggerated. This epithelial mass constantly increases, and by destroying the bone its contiguity leads slowly but surely to fatal complications. The force exerted by retained pus is often all that is necessary to break down the intracranial barriers already weakened by disease. Facial paralysis occurring during the course of a chronic suppuration is often due to an erosion of the facial canal. This opens an easy path to the meninges. The radical operation should be performed at once in such cases to establish perfect drainage. Intracranial complications require an immediate radical to remove the primary foci and to prepare the way for further indicated operative procedure.

The radical mastoid is further indicated in those cases of persistent middle-ear suppuration where there is no immediate danger, but where the disease has resisted all careful and intelligent conservative treatment for an extended period of time. A further indication is found in those cases of chronic suppurative otitis media where the individual must live in some locality in which proper treatment is not available.

OPERATION FOR THROMBOSIS OF THE LATERAL SINUS.

When there exists thrombosis of the lateral sinus, the sinus is exposed, the internal jugular and facial veins ligated, and the sinus opened (with or without the removal of the thrombus). This procedure is commonly termed the lateral sinus operation.

Sinus thrombosis is recognized clinically by the septic temperature, chills, pain on pressure and at times edema at the posterior edge of the mastoid, tenderness in the region of the internal jugular vein, and the signs of metastases. Metastases occur (in order of frequency) in the lungs, the liver, subcutaneous tissue and muscles, the joints and the kidneys; with the formation of abscess in these organs (abscess of the lungs, multiple abscess of the liver, etc.). Where the thrombus is septic, metastases are chiefly in the subcutaneous tissue, joints, and muscles. Where the thrombus extends into the jugular we have swelling and pain in the neck.

Whenever in the course of aural suppuration we find a septic temperature and symptoms which may be explained by metastases (jaundice, etc.), we are justified in opening the lateral sinus. Furthermore, the operation is indicated in the absence of all other symptoms except aural suppuration and a septic temperature which cannot be explained on other grounds.

In this condition it may be well to mention thrombosis of the cavernous sinus, which is fortunately very rare. Characteristic of this disease is the sudden onset, septic temperature, loss of vision, and edema of the eyelids.

OPERATIONS FOR BRAIN ABSCESS AND MENINGITIS.

Brain abscess of otitic origin occurs during the course of or following acute and chronic purulent otitis media. It results much more rarely from the acute than from the chronic suppuration. The abscess is usually found either in the temporal lobe of the cerebrum or in the cerebellum. The seat of temporal lobe abscesses corresponds chiefly with the tegmen antri and tympani. Abscess of the cerebellum due to extension from caries of the posterior surface of the pyramid is found in the anterior and inferior parts of the hemispheres; that from labyrinthitis in the median part; that from the sigmoid sinus in the lateral section of the cerebellum. These relations are of great importance in the surgical treatment of the condition. Brain abscesses of otitic origin should always be evacuated by way of the mastoid process; temporal-lobe abscess through the tegmen antri and tympani; cerebellar abscess by removing the bone between the lateral sinus and the posterior semicircular canal. Where a thrombosis of the sinus co-exists, the abscess of the cerebellum may be opened through the wall of the sinus. Operation by way of the mastoid is greatly to be preferred over all other methods, because at the

same time we remove the primary foci, are much more likely to locate the abscess, and obtain much better drainage. It is obviously not within the scope of this paper to consider the diagnosis of brain abscess at length. The diagnosis is often excessively difficult. A few significant features may, however, be given.

Brain abscess may exist for a long period without fever—the latent stage. Then the temperature rises rapidly and the symptoms are increased—the manifest stage. During the latent stage the abscess must be differentiated from tumor. We are sometimes aided in this by the presence or absence of eye symptoms. Choked disc is common in brain tumor, but is rarely if ever found in abscess of the temporal lobe, and is uncommon in cerebellar abscess (except in tuberculosis of the cerebellum). With the advent of the manifest stage, we must distinguish between abscess, meningitis, sinus thrombosis, and labyrinthitis. The character of the fever and the results of lumbar puncture are our most reliable aids. In brain abscess during the latent stage there is no fever. With the onset of the manifest stage the temperature rises rapidly without a break, and remains elevated with definite remissions until death or the resumption of the latent stage, when it falls rapidly to normal. It remains normal until the next manifest stage when the same temperature curve is repeated. With meningitis the onset is less rapid. The temperature rises in a step-like curve, the rise ever greater than the remission, until the maximum is reached, when the temperature is continuously high. With sinus thrombosis the fever runs a typical septic course. Euphoria is the rule in sinus thrombosis, restlessness in meningitis, and torpidity in brain abscess.

The fluid obtained by lumbar puncture in brain abscess is cloudy, contains leucocytes, but no bacteria; while the fluid in meningitis contains bacteria. The pressure and focal symptoms of brain abscess are variable and are not always reliable aids in diagnosis. One other symptom, the stiff neck of cerebellar abscess, deserves remark. This differs from the retraction of meningitis in that the patient merely tries to protect his neck from movement. In cerebellar abscess we may have all the symptoms of labyrinthitis—nausea, vomiting, disturbance of equilibrium, nystagmus (often to the diseased side), and no cochlear or vestibular function demonstrable. Here we are justified in performing the labyrinth operation and exposing the posterior fossa. If, following the labyrinth operation, the nystagmus remains on the diseased side, we are positive of an intracranial condition, probably cerebellar abscess, and may open the dura. Brain abscess is almost invariably fatal without operation. With the removal of the primary focus and the evacuation of the abscess, the patient has a chance of recovery; particularly if operated upon during the latent stage. Therefore, operation is indicated as soon as a diagnosis of abscess can be made.

Some brilliant results have been gained by the removal of the primary cause and free incision of the dura in meningitis.

Indications for the Labyrinth Operation.

The labyrinth operation consists in the opening and drainage of the labyrinth; opening the cochlea, semicircular canals, and vestibule, and at times chiseling as far as the internal auditory meatus. To accomplish this it is first necessary to perform the radical mastoid operation in order to gain access to the osseous capsule of the labyrinth. The labyrinth operation is indicated in diffuse suppuration of the labyrinth. To reach our conclusions as to the definite indications it will be necessary to go somewhat deeply into the various types of labyrinthitis and their diagnosis; and to define briefly the necessary functional tests.

Let us first consider the symptoms referable to the labyrinth. The cochlear symptoms are partial or total deafness, and pronounced tinnitus. To prove total unilateral deafness it is necessary to use an apparatus such as the sound-block which will prevent the perception of sound by the opposite ear. The vestibular symptoms are spontaneous nystagmus, vertigo, and disturbance of equilibrium. Labyrinthine nystagmus is of sudden onset and rapid decline. In aural vertigo the patient gives the history of his surroundings (e. g., the room, etc.) moving rapidly around in this or that direction. Along with this dizziness is a tendency to fall to one side or the other—disturbance of equilibrium.

The chief tests of the vestibular function necessary for differential diagnosis are the caloric and fistula tests. The caloric reaction consists in the production of movements of the eyes—nystagmus, by the irrigation of the ear with water above or below body temperature—given a vestibular apparatus which still functionates. The practical value of this test is that with it we can determine whether the vestibular apparatus still functionates or not. By caloric reaction positive we mean that irrigation of the ear with hot or cold water produced nystagmus or, in case of spontaneous nystagmus being present, influenced same one way or another, and that the vestibular apparatus still functionated. By caloric reaction negative we mean that careful and long continued irrigation with hot or cold water had absolutely no action on the eyes and that the vestibular apparatus no longer functionated. The fistula test is a procedure to determine the presence of a fistula leading to the labyrinth. The test is performed in the following manner. Air is either compressed in or aspirated from the external canal; and when a fistula exists movements of the eyes are produced in case, of course, the labyrinth still functionates. This is called the fistula symptom. It is self-evident that, if the vestibular apparatus is destroyed, the fistula symptom cannot be demonstrated, although a fistula exists. It is also of prime importance to note that in a given case of labyrinthitis, where we have previously diagnosed a fistula and can no longer obtain the fistula symptom, we may rest assured that the vestibular function is lost. It will be shown later that this is a point of excessive importance in the definite indications for the labyrinth operation.

While it is not expected of the general practitioner that he differentiate between the types of labyrinthitis, it is necessary for the general understanding of this subject to explain in brief the recognized forms of this disease. This can best be accomplished by means of a tabulation with explanatory notes.

TYPE	PREVIOUS HISTORY	PRESENT HISTORY	HEARING	CALORIC REACTION	FISTULA SYMPTOM
CIRCUMSCRIBED LABYRINTHITIS	attacks of vertigo and disturbance of equilib.	may be present or absent	+ ←→ – ←→ – ←→ (+ ←→	+ ←→ + ←→ – ←→ –)	+
DIFFUSE SEROUS LABYRINTHITIS	⊖	vestib.symps. (nystagmus to opposite side)	+ ←→ – ←→ – ←→ (+ ←→	+ + – –)	–
DIFFUSE SUPPURATIVE LABYRINTHITIS MANIFEST	⊖	severe vestib.symps. nystagmus to opposite side	– ←→	–	–
DIFFUSE SUPPURATIVE LABYRINTHITIS LATENT	vestibular symptoms vertigo etc	⊖	– ←→	–	–

+ = present; — = absent. In regard to hearing, + = patient can still hear; — = patient is absolutely deaf on the affected side. The usual combination of + and — are given in heavy-faced type. Those in parenthesis are theoretical. ⊖ absent *per se.* For example in serous labyrinthitis we have no previous history unless the patient has previously had an attack of serous labyrinthitis or circumscribed labyrinthitis.

Study of this table will show that the differentiation between the typical forms of labyrinthitis is comparatively easy. Circumscribed labyrinthitis is differentiated from the other types by the presence of the fistula symptom; serous labyrinthitis by the usually positive caloric test, the diagnosis of manifest or latent diffuse suppuration depending upon the presence or absence of vestibular symptoms.

The treatment of circumscribed labyrinthitis and serous labyrinthitis is identical, and differs radically from that of diffuse suppurative labyrinthitis. Hence we must be able to differentiate between circumscribed labyrinthitis and diffuse suppuration; between serous labyrinthitis and diffuse suppuration. Circumscribed labyrinthitis is recognized by the usually positive caloric reaction and the fistula symptom; or, in other words, by the fact that the vestibular apparatus is not destroyed. When there is profound coagulation of the endolymph and perilymph and no movements can be produced by heat or cold, the fistula symptom still may be elicited, and we are sure that diffuse suppuration is not present. In serous inflammation of the labyrinth the vestibular

apparatus usually reacts—caloric reaction positive. When it does not (caloric test negative), it is impossible to differentiate from diffuse suppuration. Such cases as the latter are fortunately extremely rare. It must be remembered that at any time during their course a circumscribed or a serous labyrinthitis may become a diffuse suppurative labyrinthitis. Therefore, if in the course of circumscribed or serous labyrinthitis the caloric reaction can no longer be demonstrated, and if a pre-existing fistula symptom can no longer be elicited, we are justified in considering the case one of diffuse suppurative labyrinthitis and must act accordingly.

The object of the labyrinth operation is to prevent meningitis. Therefore, to gain this object we must operate as soon as the diagnosis of diffuse suppurative labyrinthitis can be made and before the appearance of meningeal symptoms. Naturally the operation is also indicated, after meningitis has appeared, to remove the primary focus, but the result of the operation in this case is not nearly so gratifying as when the operation is used as a preventive measure. Circumscribed labyrinthitis and serous labyrinthitis do not *per se* cause suppurative meningitis, and our treatment of these conditions is directed toward the removal of their underlying cause—disease of the middle ear and mastoid—by the suitable mastoid operation. Should a diffuse suppuration supervene later, we must immediately perform a secondary operation upon the labyrinth. In diffuse suppurative labyrinthitis both the radical mastoid and the labyrinth operations are immediately indicated.

The operative treatment for labyrinthitis may be tabulated as follows:—

TYPE	INDICATED OPERATION		
CIRCUMSCRIBED LABYRINTHITIS	Hearing + or — Caloric Reaction + or — Fistula Symptom + } RADICAL MASTOID OPERATION	Hearing — Caloric Reaction — Fistula Symptom — } SECONDARY LABYRINTH OPERATION	
SEROUS LABYRINTHITIS	Hearing + or — Caloric Reaction + } RADICAL MASTOID OPERATION	Hearing — Caloric Reaction — } SECONDARY LABYRINTH OPERATION	
DIFFUSE SUPPURATIVE LABYRINTHITIS MANIFEST.	Hearing — Caloric Reaction — } RADICAL MASTOID and LABYRINTH OPERATIONS (at the same time).		
DIFFUSE SUPPURATIVE LABYRINTHITIS LATENT.	Hearing — Caloric Reaction — } RADICAL MASTOID and LABYRINTH OPERATIONS (at the same time).		

The indications for the labyrinth operation are then as follow:— Whenever in the course of suppurative otitis media there arise symptoms of labyrinthitis—marked deafness, tinnitus, spontaneous nystagmus, vertigo, nausea, and disturbances of equilibrium—and we find by an examination that a patient is absolutely deaf (on the diseased side), and that neither the caloric reaction nor the fistula symptom can be elicited, the labyrinth operation is immediately indicated. The one exception to this rule is tubercular labyrinthitis and advanced tuberculosis of the lungs where both the radical mastoid and the labyrinth operations are contraindicated; for tubercular labyrinthitis rarely leads to meningitis if left alone, while following the radical mastoid and labyrinth operations tubercular meningitis very frequently develops.

Where the above indications have been followed exactly, the results of the labyrinth operation are very gratifying. Ruttin, of Vienna, reports 100 cases of labyrinthitis where the above rule was followed with an operative mortality of only 1 per cent.

Before leaving this subject it may be well to speak of a tumor of the acoustic nerve, which gives rise to labyrinthine symptoms, e. g., the neurofibroma. This growth arises chiefly from the neurolemma of the cochlear division of the eighth nerve, in the internal auditory meatus, and grows very slowly. Finally, it involves the Gasserian ganglion of the fifth nerve at the tip of the pyramid. It affects in sequence the cochlear and vestibular divisions of the eighth nerve, the facial nerve, and the ganglion of the fifth nerve. Hence, symptoms appear in the following order: Impaired hearing and tinnitus and later total deafness; next nystagmus of great degree and later negative caloric reaction; next facial paralysis; and last anesthesia of the cornea, etc. Operations for the removal of this tumor have never been particularly satisfactory.

Lister Building.

SOME FURTHER STUDY OF SCORPION VENOM.

By H. V. Jackson, M. D., of Durango, Mexico.

Since the publication of his previous article in the Journal, Vol. 17, No. 7, 1910, the writer has secured these statistics of deaths, due to Alacran sting, in the city of Durango during the year 1909. The following data were furnished him by the municipal authorities: 27 males and 26 females; total 53 among less than 50,000 inhabitants; hence the death-rate due to this cause has remained almost constant during the last five years, thus bearing out his statement that it is more than one per annum for each thousand inhabitants of the district.

During the past summer, the writer has attended, amongst others, three interesting and instructive cases as follow:—

Case I was that of a male child of four years, robust and of good physique. The writer was called one hour after the sting, and found the child suffering from severe characteristic convulsions accompanied by the spume in the mouth and the ever-present sensation in the nose, which was described in the writer's former paper in the Journal. The child was constantly struggling as though to free himself of some foreign body in the nasal cavity. Chloroform was at once given, and for two hours and twenty minutes patient was kept under its influence. Upon awakening he called for a drink of water and asked for his mother. The condition being so favorable that no further danger was apprehended, the writer left the patient, and the mother quit the bedside and attended to her household duties. About twenty minutes later a hard convulsion set in during which death supervened. The family stated that the last convulsion was similar to those which were observed by the writer when he first saw the patient.

In Case II the writer was called to a man suffering from appendicitis, and on opening the door heard a loud shriek. Upon looking up to ascertain the cause, he saw a scorpion of the most poisonous variety hanging by its stinger to the hand of the servant-girl. She shook it off and asked for a remedy. There was a bottle of tincture of iodine on the table, and remembering the effect of iodine in precipitating the venom outside the body, the writer made a small incision over the site of the sting, and taking a wooden toothpick, rolled over the end of it a small pledget of cotton, dipped it into the tincture and plunged it into the wound. There were no toxic symptoms whatever and none of the after-pains. This case is especially interesting, because four years prior the same girl, at the age of eighteen, was stung by a scorpion and attended

by the writer. At that time there were severe convulsions for three hours. Drawing conclusions from this and other cases, it may be asserted that there is very little immunity caused by one sting, and that the symptoms pass away in a few days; and in this special case escape was due to prompt use of iodine in the manner stated. The writer has since used it successfully in many cases.

Case III.—A girl, six years of age, was stung by a scorpion of a poisonous variety, and when the writer arrived an hour later, he found her unable to talk and suffering from severe convulsions, with a temperature of 40° C. and a pulse strong but rapid. She was put under the influence of chloroform, and the convulsions were thus controlled. After two hours chloroform was administered only during her convulsions. After three hours the temperature fell to 36° C., and the pulse became a mere flutter. Then the anesthetic was stopped, and the convulsions continued with a decreasing severity for half an hour or more, after which the child became blue about the lips, respiration was shallow, pulse not noticeable and the lower extremities paralyzed. She repeatedly stopped breathing. The body was placed in hot water, leaving the head out, and artificial respiration was kept up for fifteen or twenty minutes, when the child with a sigh began again her feeble respiration. At short intervals she continued to have similar sinking spells succeeding each other for a period of four hours. Stimulation with alcohol and ammonia by mouth and inhalation were tried to combat the sinking. After five hours the circulation was restored, and the next day the child was as well as usual.

In the first two hours, stimulants of any kind do serious harm, but the writer is satisfied that after this period, when the pulse begins to fail repeatedly and the temperature falls, the stimulants may save life. Death after the third hour in young children, he believes to be due to nervous exhaustion.

In studying the effect of the poison on the blood, it occurred to the writer that these effects may be studied in the capillaries of a frog's foot. He placed the web of a frog's foot under the microscope in the ordinary manner, and when the capillaries were in plain view, and the corpuscles could be seen chasing each other through these small vessels, each preserving its relative distance, he injected the extract of two glands under the skin of the back. In about five minutes the capillary circulation practically stopped, and the corpuscles seemed to be in agglutinated masses, in many places completely obstructing the vessels. A slight movement of the masses could be observed with each pulsation of the heart, although they did not move with the current. He then made an ordinary preparation of a pigeon's blood stained with hematoxylin. After this the pigeon was injected with the venom extract of two glands. In sixteen minutes the pigeon died, and just before death another preparation of its blood was made, proceeding in the same manner as with the

other specimen. In the first preparation the corpuscles were evenly distributed over the slide, regular in form and having clear-cut borders. In the second preparation the corpuscles were in groups, and appeared to be larger and to have ragged edges. Then a quantity of the blood of a pigeon dying from venom was drawn off, and placed upon ice until the serum separated. This serum was of a bright red color, due no doubt to the coloring matter of the red corpuscles. From these experiments the writer is convinced that there is an agglutination of the red corpuscles, and it would appear that there is also some hemolytic action. Hence, he must modify his previous statements in this regard. The next pigeon, weighing five grams more than the preceding, was injected with the same dose of venom at the base of the wing on one side, and on the other side,

Durango Poisonous Scorpion. Life Size.

in the same place, one minute later 15 m. of an iodine salt solution were injected (1 m. of the tincture of iodine to 5 c.cm. of normal saline). This pigeon died forty minutes after the injection, thus surviving a period three times greater than its predecessor. Thus iodine when injected may have a certain amount of retarding or curative effect upon the action of the venom. In these cases the fatal dose had not been determined, as data were lacking, and each probably was given several times the lethal dose. The next pigeon received by mouth the extract of twenty glands, and for four or five hours it almost constantly sneezed and coughed. The next day it was as well as usual. Speaking further of the irritating effect of the venom upon the mucous membrane, the

writer has several times suffered for days from an acute rhinitis, induced by working over the venom. At one time when his servant was stirring the powdered glands in an 8 per cent. salt solution, he was attacked by a severe epistaxis. The coachman relieved him and five minutes later, he too began bleeding at the nose. Several members of the writer's family suffer violent paroxysms of sneezing upon entering the room during the preparation of the serum.

In the matter of the study of immunity, a young castrated male goat was secured on February 10th, 1910. Four-fifths of the extract of one gland was injected in his shoulder. Constant attention was not given the goat; one hour later the servant informed me that he was dying. The goat was prostrate, foaming at the mouth and nose and with convulsions of the face; but neither then nor thereafter, in later injections, did the writer encounter any of the marked convulsions of the muscles of the back and hind legs, such as occur in other animals which he has injected. The goat made a slow recovery. Four days later the dose was doubled, and the quantity of venom injected at intervals of four to eight days was continually increased, until after six months the extract of 130 glands was administered with no noticeable symptoms. The dose of the venom was increased to the extract of 156 glands and very nearly killed the goat. He was sick for about two days, and his weight decreased very remarkably. After a fortnight the product of 160 glands was given, and the same dose injected three times with no noticeable toxic symptoms. The writer was thus convinced that a positive and marked immunity to the poison of this variety of scorpion can be produced in a goat. The goat did not seem to appreciate being a martyr to science; and, whereas with the servants and children he was very tame and playful, when he saw the writer coming with the serum he made strenuous and noisy efforts to climb the wall and get away. However, as he was purchased from a slaughter-pen, the feeling was that he was under some obligations to serve the interests of science. The first injection was given hypodermically in the shoulder under aseptic precautions, as a weak solution of the poison destroys infusoria. The solution being considered of antiseptic value and inhibitory to germ growth, all precautions of asepsis were abandoned; and the injection was given by plunging the needle through the hair without even sterilizing the needle or using any means of sterilizing the solution of poison. During the later months as much as 6 grm. were given at each injection. The solution was prepared according to Todd's method, without any effort to put in preservative or to precipitate the spores. The writer never saw any signs whatever of tumefaction. The goat lost some flesh, and the injection seemed to cause considerable pain.

Remembering that each gland of the poison contained the extract of 25 dried glands taken without any aseptic precaution or even washing them, and that some injections contained the extract of 120 to 160 of

such glands, so treated, and that the solution was simply kept on ice until used, it seems probable that the poison has strong inhibitory action upon germ growth; hence it is the writer's intention to make further experiments along this line.

Experiments with the Serum.

For the benefit of any who may begin work or experiments of this kind upon goats, it should be stated that owing to the extreme toughness of the tissues and the small calibre and lack of blood-pressure of the superficial veins, the technique of drawing the blood is extremely difficult. The best method is to draw the blood from the jugular vein. In the writer's experiments 300 c.cm. of blood were drawn off, and the serum was separated for experiment. He had already secured encouraging results by the use of 15 m. of serum in a pigeon. Two rabbits were selected; the first weighing 1,600 grm. was used as a control and the second weighing 1,550 grm. for experiment with the serum. At 5:10 p. m. they were both injected hypodermically in the back with three minims of venom extract, being one and one-fifth times the lethal dose. One minute later the second rabbit was injected subperitoneally with 80 m. of the non-sterilized serum from blood drawn off twenty-four hours before and kept in the ice-box until the serum separated. At 5:22 p. m. both rabbits began sneezing, coughing and scratching at the nose, and there was very marked increased secretion of the nose. At 5:41 p. m., thirty minutes after the injection, the severe symptoms began, and both rabbits were down in characteristic tonic convulsions. The second rabbit seemed rather worse than the first, but at 7:04 p. m. the control died, and it was difficult to find signs of life in the second. From that time until 11:00 p. m. the second continued in convulsions with more or less symptoms of asphyxia and paralysis. At 11:00 p. m. the rabbit seemed to be much better and attempted to stand on his feet, so the writer retired for the night. The next morning this rabbit seemed as well as usual. As this rabbit weighed 1,550 grm. and received one-fifth more venom than had been determined the lethal dose of a rabbit weighing 2,000 grm., and the same amount of venom as the control which weighed 1,600 grm., the results may be considered most encouraging. The serum did not modify the first symptoms, and was so slow in action that the writer had about lost faith in it. The next experiment was made with serum that had been kept in 60° C. for one hour, as a partial sterilization, and to test its efficiency after being so treated. For this purpose rabbits were selected, the first, weighing 2,150 grm. and used as a control, received 2¼ m. of the venom solution, and after the usual symptoms died in sixty minutes. The second, used as second control, received a small portion of the venom, about 1½ m., and after usual symptoms died in twenty-four and a half hours. The third, weight 1,650 grm., received 2½ m. of the venom and also 170 of the pasteurized

serum two minutes later. The developments and symptoms were identical with those of the second control for about fifteen hours, when this rabbit commenced to make a slow recovery.

The fourth rabbit was the same which received the non-sterilized serum in the first experiment two days prior, and recovered, weight 1,550 grm. He received 2¼ m. of the venom and one minute later 125 m. of the pasteurized serum. The only symptoms developing were slight nasal irritation, slight cough, and partial paralysis, principally of the hind legs. He was able to eat and run about the room while the conditions were at the worst, and the next morning was as active as usual.

Conclusions.

1. That the serum seems to be less effective after pasteurization.

2. The serum when given undiluted seems to be slow in action, probably due to slow absorption.

3. Either immunity is conferred by the serum for at least two days, or immunity can be developed in a rabbit in two days from a single injection or sting.

THE SURGICAL TREATMENT OF INTESTINAL STASIS.

By JOHN YOUNG BROWN, M. D., of St. Louis.

"In the legacy acquired by man from his animal ancestors, there occur not only rudimentary organs that are useless, but fully developed organs equally useless. The large intestine must be regarded as one of the organs possessed by man and yet harmful to his health and life."

While this statement of Metchnikoff[1] has not been fully accepted, his writings have, nevertheless, succeeded in stimulating many to investigate this organ with the result that much knowledge has recently been acquired concerning its anatomy, physiology, and pathology. That the normal cecum and colon can be removed without any impairment to the general health of the individual has been abundantly shown.

In 1909, Groves,[2] writing on the colon in relation to colonic exclusion, submits certain facts regarding the anatomy and physiology of the colon as obtained from the study of 3 cases, and arrives at certain conclusions, among them being the following:—

1. That the absorption of food-stuffs in the colon is so slight as to be negligible.

2. That, therefore, the greater part of the large intestine is functionally unnecessary.

3. That as the contents of the colon consists of nearly one-third part by weight of bacteria, the absorption of soluble bacterial products probably occurs in all cases of colonic stagnation.

During the last eight years, the writer has had an opportunity to study the effects of complete exclusion of the large bowel in 6 cases. In one case, that of a young man fourteen years old, who was operated on for an intussusception three and a half years before the writer saw him, the operation resulted in an artificial anus situated 10 in. above the ileocecal valve, with quite a large prolapse of ileum; the large bowel was completely out of commission for three and a half years. The boy enjoyed excellent health during this time, suffering no inconvenience and seeking relief only because of the annoying discharge of fecal matter which continually bathed his abdomen.

A second case sent to the writer from Hot Springs, Ark., had a condition almost identical with the one just described. She had been the victim of two operations, for what causes it was unable to determine. When seen, a large opening in ileum was found which was fixed in the old abdominal scar. All the fecal matter had been discharged through this opening for a period of fourteen months. With the exception of an

occasional discharge of mucus from the rectum, the large bowel had been entirely inactive during this period. Her general health was perfect and she sought relief solely on account of her inability to keep herself clean.

A third case, in which the entire large bowel was suddenly put out of commission as the result of a strangulated umbilical hernia, and in which we subsequently did an end-to-end anastomosis of ileum to sigmoid, has remained in perfect health during the nine years elapsing since the operation.

Fig. 1.   Fig. 2.

Fig. 1.—Showing huge artificial anus situated eight inches above the ileocecal valve. Prolapse of intussuscepted ileum.

Fig. 2.—Same patient, six weeks after operation.

Mummery,[3] in his book on "Diseases of the Colon," says that one of the most important functions of the colon is to prevent loss of water from the body, so that by means of the absorption of water from the intestinal contents, which occurs in the colon, the body is protected against loss of fluid that would otherwise occur. He adds: "In cases, where for the relief of some diseased condition a right inguinal colotomy has been performed so that the dejecta escape at the termination of the ileum instead of by first passing through the colon, the patient always

suffers from thirst, and it is quite obvious that a great waste of body fluid is occurring."

The writer's experience does not bear out this statement. Quite recently, in the case of a woman suffering from an advanced and inoperable malignancy of the rectum, a right inguinal colotomy was performed, the ileum being cut across six inches above the ileocecal valve, and both proximal and distal ends fixed in the wound. The patient showed no symptoms of thirst nor evidence of great loss of body fluid following this procedure, but, on the contrary, improved greatly and remained in comfort until a few weeks before her death, which occurred six months later as the result of her malignancy. Many physiologists have proved that only a small amount of fluid, varying from 10 to 16 per cent. according to different authorities, is absorbed by the large intestine.

The fact that one can live without the large bowel is no argument, however, that its removal should be undertaken or that the normal fecal current should be switched, unless there can be demonstrated undoubted pathological conditions, bringing about intestinal stasis justifying such a procedure.

Macewen[4] aptly says, "With all his alleged imperfections, normal man is a much more perfect animal than the physiologist or surgeon can make him. Human effort towards the repair and perfecting of normal man has hitherto been poor compared with nature."

There are, however, pathological conditions which seriously interfere with the normal function of the large bowel, and which can be relieved by surgical measures properly applied. In 1853 Virchow[5] called attention to the frequent finding at autopsy of areas of localized peritoneal adhesions narrowing the lumen of the large bowel; and he expressed surprise that this condition had aroused so little interest.

Glénard in 1887 expressed as his belief, that the constipation associated with enteroptosis was due to kinks in the colon. In 1901, Lane, of London, in a series of papers, discussed at length the mechanics of the large bowel, and described "acquired mesenteries" and adhesions which he does not regard as evidence of inflammation, but attributes their cause to an effort on the part of nature to oppose the downward displacement of viscera, "the tendency to which exists whenever the erect posture is assumed."

Jackson[6] in 1909, in a classical paper on membranous pericolitis, describes the pathology pointed out by Lane, but makes no mention of the ileal kink. These acquired mesenteries and kinks result in contractures in the large bowel located in the cecal, hepatic and splenic flexion of the colon, and bring about impairments to the normal passage of the fecal current, resulting primarily in intestinal stasis and later on in ulcerative processes.

The pathology which has been outlined gives a definite and characteristic symptomatology which consists of malaise, backache, headache,

anorexia, eructation of gas, nausea, vomiting, loss of weight and muscular tone, obstinate constipation with occasional attacks of diarrhea. The diagnosis should not rest, however, upon the general symptoms and signs of a toxemia, but must go further and prove that this toxemia is produced by mechanical obstruction of the large intestine. This is done easily by the objective findings produced upon the movement of a bismuth meal through this part of the intestine under observation of the fluoroscope. Nearly all these patients have failed to improve under prolonged medical treatment. Many of them have been subjected to needless operations, and they seek surgical relief as a last resort. In all such cases a careful analytical diagnosis is essential. The bismuth meal, with the twenty-four or forty-eight-hour-interrupted fluoroscopic examinations, in connection with the symptomatology and physical findings, will demonstrate conclusively the existence of intestinal stasis. If Lane is correct in his views that these pericolonic adhesions are due to a compensatory process, the mere division of adhesions will not suffice to relieve these cases. On the contrary, it would seem that this procedure would be undoing Nature's efforts towards the accomplishment of cure. Exclusion of the colon and its lateral implantation into the sigmoid seem to meet the indications. Of course, in addition to this, it is necessary to correct any other intra-abdominal condition that may be present.

During the last three years, the writer has operated on 16 carefully selected cases of this type. In all these cases, a diagnosis has been arrived at by a process of exclusion, and in each, intestinal stasis has been demonstrated by means of the bismuth meal prior to operation.

A long incision through the right rectus sufficient for general exploratory purposes was made. The ileum was divided 6 in. above the ileo-cecal valve, and both proximal and distal ends closed, a lateral anastomosis then being made between ileum and sigmoid. Prior to this, a general exploration of the abdomen was made, and such work done as the individual pathology would indicate. Of the 16 cases operated on, 14 presented well-defined pericolonic membranes, and, in all, there was present kinking of the ileum. In 2 of the cases, the condition found at operation was undoubtedly due to primary involvements of the appendix. In 9 of these cases the constipation and the symptoms of intestinal toxemia have been entirely relieved, the patients gaining in weight and showing marked general improvement. In 5 of the 14 cases, while the improvement has been satisfactory, much annoyance has resulted from gaseous distension and pain in the excluded cecum and colon. This is the type of case in which Lane advocates a secondary operation, which operation should consist of the removal of the colon down to the sigmoid.

McKenzie, of Portland, in a recent article in the *Annals of Surgery*, advocates that instead of this extensive surgical procedure, a cecostomy be done. He reports several cases in which the symptoms before described have been relieved entirely by this simple procedure. This opera-

tion appeals to the writer quite strongly, as it can be done without difficulty or danger; and in view of the fact that the fecal current has been completely turned, no annoyance would follow from this small opening in the cecum, as there would be no fecal drainage therefrom. Other operations which do not completely exclude the colon from the gastro-·intestinal tract are also undoubtedly indicated in the treatment of chronic diseases of the colon. For instance, in ulcerative colitis due to tuberculosis, amœbic dysentery, etc. without stricture or other causes of obstruction, colostomy is preferable to appendicostomy merely as a means of irrigation of the colon. In the author's experience with a considerable number of these cases, this operation followed by proper medical treatment has proved entirely satisfactory. In those cases having mechanical obstructive lesions, a complete exclusion followed by the Lane operation has produced better results. The Lane operation in this series of cases has been unable to relieve the symptoms in those cases of painful constipation and in those cases in which there was a marked displaced or mobile cecum.

In conclusion it cannot be too strongly emphasized that neither the Lane operation nor any ·of the suspension operations should be undertaken unless there are present well-defined demonstrable pathological lesions justifying their performance. All so-called atonic and neurasthenic types of enteroptosis will yield far better results if given proper rest, hygienic and dietetic treatment.

BIBLIOGRAPHY.

1 Metchnikoff: The Nature of Man. G. P. Putnam's Sons, New York.
2 Groves: The Functions of the Colon in Relation to Colonic Exclusion. (*Proc. Royal Society of Medicine*, London, Surg. Sect., Vol. II, p. 121, 1908-1909.)
3 Mummery: Diseases of the Colon and Their Surgical Treatment. Wm. Wood and Co., New York. 1910.
4 Macewen: The Function of the Cecum and Appendix. (*Lancet*, 1904.)
5 Virchow (*Archives*, Vol. 281, 1853).
6 Jackson: Membranous Pericolitis. (*Surgery, Gyn. and Obstet.*, p. 278, 1909.)

VERSION IN TRANSVERSE PRESENTATIONS RESULTING FROM THIGH-PRESSURE PRODUCED BY POSTURE.

By A. F. A. KING, M. D., of Washington, D. C.

The dangers of internal podalic version in transverse presentations, especially the liability to uterine rupture and septic infection, particularly in unfavorable and neglected cases, are so pronounced that any safer method by which turning can be accomplished ought to commend itself to the favorable consideration of obstetricians.
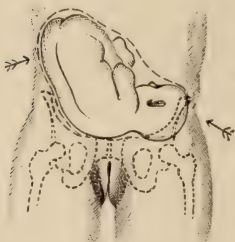
Fig. 1.   Fig. 2.

Fig. 1.—Left shoulder presentation. Head in right iliac fossa.
Fig. 2.—Squatting posture. For case shown in Fig. 1.

We find this safer method in Nature's plan of correcting malpresentations by pressure of the thigh columns upon the abdomen produced by a crouching (squatting) posture, to be now described.

In transverse cases where the head rests on the right iliac fossa, let the woman place her left foot flat upon the ground and forward, i. e., in advance of the body, and then assume the squatting attitude by placing the right foot much farther in the rear of the body, and resting only on its toes. This is the usual and more convenient method of squatting. To squat symmetrically, with both feet in line and flat upon the ground, is much more difficult. In cases where the head rests on the left iliac fossa, the right foot must be planted flat and forward, while the left foot rests behind and on its toes.

By way of experiment and demonstration, if the reader will kindly

assume this posture for a few seconds, he will see at once that the thigh of that limb of which the foot is planted flat and forward will press upon quite a large surface on the lateral aspect of the abdomen, in a direction that is at once upward and inward towards the median line, the thigh column itself being almost vertical; while the thigh of that limb, whose foot rests on its toes and posteriorly, presses upon a much more limited surface of the lateral aspect of the abdomen, low down over the "iliac region," and in a direction that is slightly upward but mostly inwards towards the median line, the thigh column itself being almost horizontal.

Now the reader will easily observe that in a parturient woman, who assumes this posture, the horizontal thigh of the posterior-placed foot will press the child's head from the iliac fossa into the pelvic entrance;
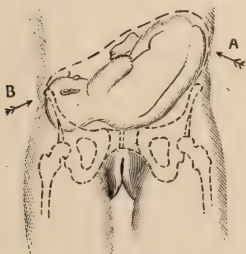
Fig. 3.   Fig. 4.

Fig. 3.—Right shoulder presentation. Head in left iliac fossa.
Fig. 4.—Squatting posture. For case shown in Fig. 3.

while the other (vertical thigh of the forward foot) will lift the back and breech of the child upwards and inwards towards the ensiform cartilage. Thus the thighs, one on each side, act on the two poles of the fetal ovoid in such a manner as to make it glide round from a transverse (or oblique) position into a vertical one, and the cross-presentation is corrected without the infecting fingers of the obstetrician having even touched the woman.

In difficult and neglected cases, with loss of the liquor amnii, etc., it may be necessary for the woman to have a few pains in the selected position before the child will turn. And in others, where the patient for some reason or other is unable to rise and assume the desired posture, the obstetrician may secure the desired version by manipulating the lower limbs of the woman in such a way as to make the two thigh

columns press upon the abdomen, uterus, and child in the manner indicated, observing always that the thigh of that side on which the head lies must be pressed upon the abdomen low down and almost horizontally (like the thigh of the backward foot); while the other thigh must be pressed almost vertically on the opposite side (like the thigh of the forward foot in the squatting posture).

In our textbook explanations of "spontaneous version" or "spontaneous rectification," the process has been ascribed to unilateral and unsymmetrical contractions of the uterus, and other hypotheses; but, in a good many cases where the operator was preparing to do an internal version, he has been surprised to find the presentation correcting itself while the patient assumed a squatting attitude over a low chamber-vessel to urinate, in preparation for the proposed, and now unnecessary, operation.

I have spoken of this rectification of transverse cases by posture, as "Nature's Method," because among many primitive.peoples the common posture for parturition is the same as for defecation, the parturient woman meanwhile steadying herself during delivery in this posture by grasping a sapling of the woods; or, in lieu of this, a stake is firmly driven into the ground for the same purpose. We have still, perhaps, a vestigial remnant of this old custom indicated by the civilized woman of to-day still desiring, instinctively, to grasp and pull upon a sheet or any other secure body placed in front of her.

If our trained nurses were properly instructed how to use this method, while waiting for the obstetrician, a dangerous delay, rendering the usual method of version difficult, might sometimes be avoided.

It may be observed that among civilized women, since the invention of water-closet seats, the thigh columns do not press upon the sides of the abdomen with anything like the degree of force which occurs during the defecation posture of primitive peoples. Moreover, what pressure the thighs do exert upon the sides of the abdomen of the woman while seated during defecation, is a laterally symmetrical pressure, alike on both sides, which as we have shown, is not the proper kind of pressure to secure rectification of a transverse presentation. It is probably owing to the squatting posture that transverse presentations are comparatively infrequent among primitive peoples, though they do occur occasionally, probably from extraordinary causes that posture alone is inadequate to relieve.

For those who may desire further details of this method, with illustrative cases (of which I have others yet unpublished), I may refer them to the *Transactions of the American Gynecol. Soc.,* Vol. 32, pp. 32-42, 1907; also *New York Medical Journal,* November 27th, 1909, and my own "Manual of Obstetrics," eleventh edition, 1910, pp. 387-388, etc.

PENTOSURIA.

By EDWIN D. WATKINS, B. S., M. D., of Memphis,
Professor of Chemistry, University of Tennessee Medical College, Memphis.

The object of this paper is to bring out certain facts with reference to reducing the carbohydrates that occasionally occur in the urine, and which substances do not indicate diabetes mellitus.

The reducing substances in question are the pentoses. There are several pentoses known in the pure state. They are carbohydrates and have the general formula $CH_2OH (CHOH)_3 COH$. One of the pentoses, arabinose, may be prepared by the action of sulphuric acid on cherry gum. The pentoses yield furfuraldehyde on distillation with hydrochloric acid. They respond to Fehling's and to Trommer's tests. They yield osazones with phenylhydrazine. They do not ferment with yeast.

The osazones formed with pentose dissolve in water at 60° C., while glucosazone does not dissolve in water at 100° C. This fact serves as a means of differentiating between hexose and pentose.

Pentosuria is a result of deviation from normal metabolism. The origin of pentose in the urine is as yet not agreed upon. By some it is considered as derived from galactose by oxidation, while others hold that it is a product of nuclein metabolism of the pancreas. Pentosuria is probably associated with cerebrin metabolism. It does not indicate an alteration of normal carbohydrate metabolism, being entirely independent of diabetes mellitus. Variations of the ingested hexoses have no effect upon the pentose excreted in the urine.

Pentosuria is known in two clinical types: one in which the excretion of optically inactive arabinose in the urine daily is not dependent upon any particular diet; the other in which the excretion of pentose in the urine follows the ingestion of certain foods, as cherries, pears, strawberries, prunes, grapes, blackberries, wine or beer. In the latter type dextro-rotary pentose occurs in the urine. In this second type the pentose is L arabinose, and is derived from the pentosan of the food.

Pentosuria may occur with diabetes. It may be a family characteristic.

The importance of recognizing pentosuria and differentiating it from diabetes is evident. Any urine which reduces Fehling's solution should be tested with yeast, and in case it does not ferment it should be tested for pentose.

A certain test for pentose is as follows: 10 c.cm. each of urine and strongest hydrochloric acid are mixed in a test-tube with a small quantity of orcin and the whole heated to boiling; if pentose be present the solution will take on a distinct green color.

The writer's case of pentosuria was that of a man forty years old. He came to the writer thinking that he had kidney disease. He complained only of headache at night. There was no albumin in the urine and microscopic examination was negative. The urine specific gravity was 1.022. There was a decided reduction on boiling with Fehling's solution. There was no fermentation with yeast. The orcin test was positive.

The only limitation of diet which affected the pentose was elimination of berries and pears. The patient could eat any quantity of bread, potatoes and rice without appearance of pentose in the urine so long as berries and pears were forbidden. This was in July, 1911.

A diet from which berries and pears were excluded sufficed in fifteen days to cause disappearance of reducing carbohydrate in the urine. Since that time there has been no reappearance of the pentose until February, 1912, when the writer allowed him to include grape-juice in his diet. All this time there was no limitation of carbohydrate in the diet with the exception of the fruits.

It is evident to the writer that the pentose in the urine is independent of ingested hexoses. The presence of the pentose in the urine did not seem to have any associated symptoms. He is following the case with much interest.

MEDICAL AND SURGICAL PROGRESS.

EPIDEMIC SORE THROAT.

A REVIEW OF RECENT LITERATURE.

By Wm. B. Chamberlin, M. D., of the Editorial Staff.

1. Davis and Rosenow: An Epidemic of Sore Throat Due to a Peculiar Streptococcus. (*Journ. Amer. Med. Assoc.,* p. 773, March 16th, 1912.)
2. Darling: Clinical Aspects of the Epidemic of Septic Sore Throat in Cambridge, May, 1911. (*Boston Med. and Surg. Journ.,* p. 904, December 14th, 1911.)
3. Editorial (*Bulletin of Medical and Chirurgical Faculty of Maryland,* p. 167, April, 1912).
4. Editorial: Streptococcus Tonsillitis ("Septic Sore Throat") and Milk. (*Journ. Amer. Med. Assoc.,* p. 345, February 3rd, 1912.)
5. Goodale: Observations on the Epidemic of Sore Throat Occurring in Boston and Vicinity During May, 1911. (*Boston Med. and Surg. Journ.,* p. 908, December 14th, 1911.)
6. Richardson: An Epidemic of Tonsillitis Due to Infected Milk. (*Boston Med. and Surg. Journ.,* p. 907, December 14th, 1911.)
7. Winslow: An Outbreak of Tonsillitis or Septic Sore Throat in Eastern Massachusetts and Its Relation to an Infected Milk-Supply. (*Boston Med. and Surg. Journ.,* p. 889, December 14th, 1911.)
8. Hamburger: An Epidemic of Septic Sore Throat in Baltimore and Its Relation to a Milk Supply. (*Journ. Amer. Med. Assoc.,* April 13th, 1912.)
9. Hirshberg: Malignant Pneumococcus Tonsillitis. (*Journ. Amer. Med. Assoc.,* April 20th, 1912.)
10. Miller and Capps: Epidemic of Sore Throat Due to Milk. (*Journ. Amer. Med. Assoc.,* April 13th, 1912.)

From time to time there have appeared, in the English journals, reports of epidemics of sore throat, possessing definite and peculiar characteristics and bearing a close relationship to the milk-supply. The English have designated this by a special term "septic sore throat," to distinguish it from the more usual forms of tonsillitis. In March, 1908, such an epidemic occurred in Christiana. The first outbreak reported in this country occurred in Boston in May, 1911, and was of unusual severity. Similar outbreaks have since been reported from Chicago and Baltimore. These have not been as universal as that reported from Boston, and have been

distributed over a longer period of time; nor is it stated that the Chicago epidemic bore any relation to the milk-supply. The characteristics of the disease, however, seem to be identical and may be stated in brief as follows.

"The disease is marked by acute onset with rapid rise of temperature, acute tonsillitis and pharyngitis, often associated with loosely attached threads of membrane. The glands in the neck become greatly swollen." On incision, however, they were rarely, or never, found to contain pus. The formation of membrane over the tonsils and pharynx was so striking that in many cases antitoxin was administered before the true bacteriological findings were known. When the membrane is wanting, "the throat presents a diffuse dusky redness, with profuse secretion of mucus. In addition to the aforementioned characteristics there is extreme prostration, often apparently out of all proportion to the severity of the local manifestations." The tendency to complications is great. Among these, in addition to the glandular involvement, may be mentioned empyema, arthritis, pulmonary abscess, otitis media, brain abscess, sepsis and peritonitis. Cases are also reported of abscesses in remote parts of the body, though septic arthritis with pus formation does not seem to have occurred.

There is a striking uniformity in the bacteriological findings in the various epidemics, when examination of the infecting organisms has been carried out. There are found cocci, occurring usually in short chains and possessing a definite capsule. Morphologically they seem to occupy a position midway between the streptococcus pyogenes and the streptococcus mucosus and possessing certain of the characteristics of each. "The organisms possess a high degree of virulence, readily killing guinea-pigs, mice and rabbits in from twelve to twenty-four hours, from septicemia and serositis following intraperitoneal inoculation of small quantities. Animal passage increases strikingly the capsular substance, and the growth becomes more profuse and mucoid."

As before stated, mention is not made of any connection between the Chicago epidemic and the milk-supply, while this relationship in the Baltimore epidemic is merely stated. In the Boston epidemic the relation to milk-supply is strikingly evident from the statistics given. There occurred here 1,043 investigated cases within a period of a very few days, with 48 deaths. Between 85 and 90 per cent. of the cases in the Boston and Cambridge epidemics were found to have used milk from one source —the Deerfort Company Farms. The milk which this company supplies to its customers comes from two sources, the Northboro and Southboro districts. "It was the Southboro supply of milk alone which corresponded with the spread of tonsillitis." The Deerfort Company has always been a pioneer in the campaign of supplying pure milk to its customers, and in the reported epidemic made every effort to assist the health authorities in their investigations. On both farms, the cattle and the milk receive most thorough and regular inspection. An idea of the care exercised by the company may be gained from the following circular which was sent out in August, 1910.

"Owing to the prevalence of typhoid fever in the neighboring towns, it is necessary that we should take extra precautions to safeguard our milk-supply, as milk is a very favorable medium for the growth of this disease. For this reason we think it best to remind you at this time of our promise to pay for all milk withheld in case of sickness from this or any other contagious disease, if our patron notifies us himself, and at once.

of any such sickness in his household or among his employees. Information should not be withheld on account of a light case, as it is quite as likely as a severe one to transmit the disease. We wish to ask your co-operation with us in this regard, as it is the only way that we can maintain our record of never having had an epidemic of any contagious disease traced to our milk-supply."

Investigation showed that, whereas no one who came in direct contact with the milk in the Southboro district was suffering from the disease, still there had been an epidemic of septic sore throat in the village for two months previous to, and coincident with, the Boston epidemic.

The large number of fatalities in the Boston epidemic is most striking, 48 deaths. There were 8 cases of peritonitis, all fatal. Females were more frequently afflicted than males, and adults more frequently than children. The disease when occurring in children was usually mild and presented few complications. "The most serious cases occurred in patients above the age of forty." Out of 11 cases of pneumonia, 8 died.

According to the *Journal of the American Medical Association*, the lessons to be drawn from these outbreaks are as follow:—

(1)   Epidemics of streptococcus infection, localizing in the throat especially, may be due to contaminated milk-supply.

(2)   Streptococcus throat infection—septic sore throat—must be recognized as one of the dangers connected with the supply of raw milk, even when this is most carefully supervised.

(3)   As pointed out by Winslow, the only real safeguard against such otherwise unpreventable outbreaks would seem to lie in pasteurization, carried out preferably by the holding system and in the final packages.

POTT'S DISEASE TREATED BY ANKYLOSING OPERATIONS ON THE SPINAL COLUMN.

A REVIEW OF RECENT LITERATURE.

By NATHANIEL ALLISON, M. D., of the Editorial Staff.

1. Lange: Support for the Spondylitic Spine by Means of Buried Steel Bars Attached to the Vertebræ. (*Amer. Journ. Ortho. Surg.*, Vol. VIII, No. 2, November, 1910.)
2. Hibbs: An Operation for Progressive Spinal Deformities. (*New York Medical Journal,* May 27th, 1911.)
3. Albee: Transplantation of a Portion of the Tibia into the Spine for Pott's Disease. (*Journ. Amer. Med. Assoc.,* September 9th, 1911.)
4. Whitman: The Operative Treatment of Deformity of Pott's Disease. (*Annals of Surg.,* December, 1911.)

The employment of operative measures in the treatment and in the correction of deformity which is associated with Pott's disease, has recently come again into the surgical foreground. Though the treatment of Pott's disease has become routine, and though the principles upon which the mechanical support of Pott's disease have been demonstrated to be efficient, there is, nevertheless, a recurrent tendency toward operative measures.

In ancient practice operations were done to correct forcibly the kyphosis, and fresh interest was aroused in 1897, when Calot advocated the forcible reduction of the deformity. Chipault, several years before him, had recommended the operation, but it was found at autopsy that the capacity for bone-formation between the separated vertebral bodies was inadequate to fill the gap produced when the spine was made straight.

These operations being unproductive, the treatment of Pott's disease and the correction of deformity incident to Pott's disease lapsed again into the ordinary routine of mechanical treatment.

Hadra recommended in 1891 the suturing of the spinous processes of the diseased and adjoining healthy vertebræ with twisted silver wire. He, however, had not employed this operation in Pott's disease, but had used it on a case of spinal fracture.

Chipault in 1893 advised the denuding of the adjacent spinous processes, and afterward binding them together with silver wire. This operation apparently met with very little success, and consequently, was not generally used.

Lange has recently attempted to replace the external support by internal splints, which, being independent of the patient's control, would therefore be more efficient. He found that the tissues of the human organism would well tolerate implanted foreign substances, and he hit upon tin-plate steel rods 10 cm. long and 5 mm. in thickness as being the

best internal splints to employ. These splints were inserted close to the spinous processes on either side of the diseased vertebræ, and were attached to the spinous processes by silk cords. The muscles were then sutured over the splints and a plaster jacket was applied. The case reported by him did well, and there was marked diminution in symptoms and in deformity.

Hibbs has performed an operation recently, which has for its design the production of adhesions between the spinous processes and also the diminishing of the kyphosis. This operation is done by splitting the interspinous ligament and separating it, with the periosteum to either side. A chisel is then used to divide the spinous process above the diseased area, the spinous process below is then cut, and so on down until finally a sound spinous process is again reached. This entire mass is then tilted downward, so that the tips are brought into contact with the upper part of the area from which the spinous process of the vertebræ below has been separated. The case upon which this operation was done was kept in plaster for four months. It was a case of disease in the second lumbar vertebræ.

Albee reports 3 cases in which the bone transplantation was made from the tibia to the region of disease in the spine. In order to place this bone graft, the spinous processes near the disease are split a little laterally to the centre, and in this gap the bone graft was inserted.

Whitman has recently performed a similar operation, but, perhaps, a better designed operation. He has taken a large graft from the tibia 7 in. in length, which was again split into two pieces. It retained its periosteum and its endosteum. Through an incision over the diseased area of the spine, the spinous processes and lateral masses of the vertebræ were exposed. The spine was forcibly straightened and the two grafts were inserted close to the spinous processes on either side, their periosteal surfaces being uppermost. The wound was closed and a plaster jacket was applied. Unfortunately, five weeks after operation, this case died of tubercular meningitis.

Though these operations seem attractive from the operator's standpoint, it is to be noted that they are decidedly in an experimental stage, and that their value cannot be determined except by years of observation.

It seems that Whitman's, or Lange's, operation, is the best from a mechanical standpoint. It seems also that the operations of Albee and Hibbs run the danger of still further weakening the already weakened spine. An important factor to be determined is the possibility of the bone grafts maintaining their strength as bone in the operations of Whitman and Albee. The operation of Lange is based upon the use of a metal support which would not lose its strength as a support to the diseased area. In consequence, it seems that the operation of Lange is, perhaps, the best which has been suggested.

TABES DORSALIS.*

By Sidney I. Schwab, M. D., of the Editorial Staff.

It has been said that if it were possible to understand, in all its essential details, the problem of tabes dorsalis, most of the puzzles associated with organic diseases of the nervous system would be cleared away. The progress of neurology might almost be said to go hand in hand with the progress that has been made in locomotor ataxia.

The Neurological Society of Paris has recently devoted two sessions to the consideration of tabes dorsalis, under the title "The Delimitation of Tabes Dorsalis." In the first of the two sessions there were presentations of actual cases, showing all sorts of variations from the ordinary. In the second session particular problems were taken up and discussed. The whole subject was so thoroughly considered that we may assume that what is given is largely the present knowledge which we possess on tabes dorsalis. The report of these meetings has just appeared in the *Revue Neurologique*, and it seems that a résumé of these two meetings might be of great service to those to whom the subject is of interest. To no practitioner of medicine, whether he be a specialist in any branch, or an internist, can tabes dorsalis be a matter of indifference.

The first case presented was an arthropathy of the knee, with an Argyll-Robertson sign, together with lymphocytosis of the cerebral spinal fluid. In this case, presented by Massary and Pasteur-Vallery-Radot, the authors point out how early manifestations of tabes might show themselves, outside the involvement of the nervous system, as such. The second case, likewise an early case of tabes, was a man of forty-six, who had had syphilis for seventeen years, and showed, as the only evidence of tabes, pains of a typical lightning character. Outside of a slight lymphocytosis and a possible Argyll-Robertson sign, there was absolutely no indication of tabes present. Sensation was normal, reflexes were normal, and there was no ataxia. The question in this case, which would naturally come up, is, How is it possible to distinguish between a syphilitic meningitis and an early tabes?

The third case, presented by Déjerine and J. Jumentic, showed a curious phenomenon, to which they have given the name of inversion of the patellar reflex. By inversion of the knee-jerk they mean that instead of the quadriceps acting upon the tapping of the tendon, the muscles of the hip are activated, and there results, instead of extension at the knee, flexion at the knee.

The fourth case, presented by Henri Claude and Louis Cotoni, showed a symptomatic group, consisting of gastric crises, with a marked variation in arterial tension. A case of osteo-arthropathy of the type called tabetic was shown in a patient who had no evidence of tabes at all, but was probably a syphilitic. The general aspects of the knee, as well as the clinical manifestations, were typical of a tabes, and could not be in any way differentiated from such as are seen in tabetics.

These are some of the important cases which were presented at the preliminary meeting; and they were apparently shown for the purpose of demonstrating how wide the limits of our conception of tabes dorsalis must be placed in order to include all the variations in clinical pictures.

Massary spoke first on the clinical limitation of tabes. He gave a very interesting sketch of the history of tabes, calling attention again to Duchenne, of Boulogne, who in 1858 gave a description of the disease, which even to-day is important in our efforts at its limitation. He drew attention to the fact that there were some individuals formerly confused with paralytics, but who were far from being paralytics, and have the curious distinction of an absolutely intact muscular power, and who showed, as the real symptoms, a more or less complete absence of co-ordination of muscular movements, with the preservation of muscular power. Duchenne thus isolated the malady as essentially chronic, characterized especially by the progressive abolition of co-ordination in voluntary movements, simulating a paralysis, but different from it in the preservation of the muscular power; and in order to epitomize this definition, he invented a new term which he called progressive locomotor ataxia. Since Duchenne's time, the symptomatology of the affection which he described has become more and more complex. In 1869 Argyll-Robertson showed the importance for its early diagnosis in the loss of pupillary reflex to light, and in the preservation of the accommodation reflex. In 1875 Westphal pointed out the early disappearance of the knee-jerk. Later came the discovery of gastric crises, arthropathy by Charcot, laryngeal crises and spontaneous fractures.

It only requires a glimpse, at the various attempts that have been made to explain the underlying anatomical changes productive of this group of symptoms, to realize how difficult it is to limit clinically or anatomically the term tabes dorsalis.

Many descriptive terms have been suggested to describe the pathological conditions underlying tabes, such as atrophy of the posterior column of the cord, sclerosis of the posterior column, posterior leucomyelitis, gray degeneration of the posterior cord. These terms are as indefinite and unsatisfactory as any of the clinical definitions that have been advanced. At the present time one speaks of a radiculitis, implying, naturally, that the degenerative process either originates or is largely limited to the posterior roots. But against this conception is the fact that all cases of degeneration of the posterior roots are not tabes. Nothing is more common than to find a radicular lesion in cases which clinically bear no resemblance at all to tabes; particularly is this so in cases of syphilitic inflammatory process of the posterior roots.

Brissaud has suggested the idea, that what is necessary for the development of tabes in cases in which there is a degenerative process located in the posterior roots is a certain tendency to react in a tabetic way on the part of the patient, either from a hereditary or acquired basis. He suggests that the central protoneuron, or the peripheral sensory neuron, is embryologically either of a lessened degree of vitality or a different degree of vitality, which reacts in the presence of the tabetic lesion in a manner to produce clinically the symptoms of locomotor ataxia.

When we turn to the laboratory work on tabes, is it possible to find there a criterion which will serve to delimit our conception of tabes? Can we find in the serological reactions something which will furnish us with facts sufficiently characteristic specifically to outline our conception? Tabes is not comparable to typhoid and other infectious diseases, because

tabes is not an infectious disease, but is a complication of an infectious disease.

Researches made during the last few years in the cerebrospinal fluid of tabetics have given interesting results, but they are only secondarily of use in the question under discussion. The cerebrospinal fluid of tabetics presents a cytological reaction more or less abundant, a variable augmentation of albumin, and, finally, a Wassermann reaction. While these reactions tend to prove absolutely the syphilitic origin of tabes, they seem to be incapable at present of limiting the conception of tabes, because they are found equally well and equally as constant in cases of nerve syphilis, meningitis, arteritis, and general paralysis. It has been found from numerous observations that in many syphilitics, the spinal fluid of whom shows a more or less degree of permanent lymphocytosis with augmentation of the albumin content, such patients are very likely to develop into tabes.

There are a number of interesting questions brought up here and there in the course of this general discussion. Among them, not the least interesting is whether there is such a thing as a monosymptomatic tabes. Sicard, while not admitting its existence, has asked whether it is not possible to fix upon a conventional minimum number of symptoms upon which the diagnosis of tabes might be based. If this could be done, it is scarcely necessary to emphasize its importance. Our task would be very much simplified, for in practice we could say, in the presence of a given case, that we have discovered three symptoms of tabes, therefore, the patient is tabetic; and, on the contrary, if we could find only two, then a diagnosis could not be made. In order to arrive at such a means of diagnosis, it would be necessary, on the one hand, that the symptoms should all have an approximately equal value, and, on the other hand, that they should all appear at the same time; but nothing is more uncertain than the diagnostic value of the various symptoms of tabes. To put upon the same level the value of the Argyll-Robertson pupil and a mild disturbance in the cutaneous sensibility of the plantar region would seem to be illogical. On the one hand, it is quite certain that the individual should be considered a tabetic if he presents an Argyll-Robertson pupil, the absence of knee-jerk, and the shooting pain; yet, on the other hand, the patient, who shows a slight diminution of sensibility, occasional vertigo and disturbance in the sense of smell, without any symptoms pointing to motor disturbance, would be difficult to classify. The whole question of the delimitation of tabes would be rendered very much easier if we possessed one symptom which was truly pathognomonic, and constantly found exclusively present in tabetics; however, this symptom does not exist. The Argyll-Robertson pupil itself, which is considered one of the most important symptoms of tabes, can be observed in other diseases, such as syphilitic meningitis, and can be found lacking in tabes. This has been demonstrated again and again.

In conclusion, the following four questions are proposed and are here given merely in outline: First, should it be admitted that a monosymptomatic tabes exists characterized simply by gastric crises, or by arthropathies, or should it be necessary, in order to make a diagnosis, to await the appearance of other symptoms? Second, if the monosymptomatic idea of tabes should be rejected, is it possible to fix upon a minimum number of symptoms that are essential for the diagnosis of tabes? Third, inasmuch as no symptom of tabes is pathognomonic, can there be cases of tabes in which the most characteristic symptoms are absent? Fourth,

can the diagnosis of tabes be based upon the evolution of the disease and the results of treatment? Can tabes be separated from radicular meningitis, which is cured in some weeks by specific treatment, either mercurial or arsenical?

Massary placed, therefore, before the meeting, a complete résumé of our present knowledge of tabes, its present difficulties and what solutions seem the most probable. The foregoing sketch very inadequately gives what must be considered one of the best presentations of the subject found in any literature.

Nageotte presents, as his part of the discussion on the question whether tabes can be defined upon the basis of pathology and etiology, this definition of tabes: Tabes is characterized anatomically by an inflammatory lesion which attacks a certain number of sensory, or motor roots at the place where they escape from the subarachnoid space in the cord, and that this change depends upon general syphilosus of the meninges. In addition, clinically, it is to be recognized only if the radicular region gives symptoms proportionate to its intensity and to its localization. Certain radicular symptoms would have to be marked by the degeneration of the pyramidal tract, causing the abolition of reflexes, and shown by the mental state of the patient as giving the origin of pain. There results the fact that the anatomical limits of tabes should be more extensive than the clinical limits. There exists a special form of diffuse syphilitic lesion which is not especially limited to the nervous system, but out of which tabes draws its origin. The task of the clinician should always be to observe each symptom and to establish its origin. If it results from a radicular neuritis, it is a symptom of tabes.

Babinski, at this point in the discussion, accepted the proposed definition of Nageotte, and suggested that inasmuch as this definition was based upon a series of remarkable anatomical researches, it would be of advantage for the further discussion of the subject to regard it as a true one.

Claude believes that it is impossible to establish in a conventional or arbitrary way a purely clinical delimitation of tabes. Tabes is a disease which has its own etiology and pathology, which is caused by lesions which are peculiar to it, the symptomatology of which and the valuation of which are controlled by pathogenic and anatomical changes in the tissues of the nervous system. It would be possible to delimit and define tabes if one knew precisely the nature of the alterations in the nervous system which caused the disease. As far as the diseases clinically are concerned, one has a right to speak of syndromes, which bear a more or less direct relation to this or that disease. It is, in effect, a method of symptomatic grouping which originates our diagnosis for us. We are then justified in admitting on further discussion the existence of tabetic syndromes, which would be formed by the union of three or four cardinal symptoms: The Argyll-Robertson sign, the abolition of the tendon reflexes, the radicular symptoms, pain and anesthesia, disturbance in a radicular manner. Now, this expression of the tabes syndrome has merely relative value as pointing towards the diagnostic outlook. This syndrome could be met with in other diseases of the nervous system, which we could not consider as cases of tabes on account of their valuation and the lesions which we would be able to determine were present. The symptomatic syndrome then would be merely the expression of a tabeto-form type and not true tabes.

With the existence of the tabes syndrome in a given case, the study

of the variation and progress of the disease would show whether tabes dorsalis is to be considered or not, chiefly by the final evolution of the disease, permanence of the symptoms and other clinical signs. The determination of the modifications of the blood and spinal fluid in relation to syphilis would constitute one of the props upon which the diagnosis would be based. A discussion of the intrinsic value of each of the different symptoms of tabes, or a grouping of two or three of them of unequal value, would not establish a sufficient basis for the delimitation of tabes dorsalis. On the question of the monosymptomatic appearance of tabes there are two interesting observations by Dufour. One case presented during life only a Argyll-Robertson sign. The autopsy showed at the level of the dorsal region of the cord a lesion of chronic meningitis, and a very definite alteration of the posterior nerve-root in the process of destruction. The second case showed during life the Argyll-Robertson sign in one eye, and the abolition of the knee-jerk. The autopsy showed in the spinal cord sclerosis of the posterior column, characteristic of tabes.

In regard to the value of the principal symptoms of tabes, Babinski states that pains themselves are sufficient in certain cases to diagnose the disease. He further adds that in a given case, if he were positive that the description given by the patient of his pains was authentic, the diagnosis could be made. On the other hand, he calls attention to the risk of too much reliance upon subjective symptoms. Babinski further believes that the gastric crises are especially characteristic of tabes, but he suggests how easy it is to be deceived by other conditions.

Déjerine speaks of a certain number of cases of gastric crises which seemed to be monosymptomatic, the tendon reflexes being normal, the pupils being normal, no lightning pains and no vesical disturbance. In such cases a careful examination of the cutaneous sensibility has enabled him always to determine very slight, but definite variations, at the level of the eighth cervical and first dorsal segments.

Massary describes a similar case of gastric crises without any other symptoms of tabes, as also does Souques, who, on the other hand, describes 2 cases in which the gastric crises had preceded for some years the appearance of the classic symptoms of tabes.

In regard to the motor inco-ordination, Sicard believes that the inco-ordination in tabes never exists isolated—there are always added other signs in the tabetic series. The disappearance of the knee-jerk cannot be considered as diagnostic of a monosymptomatic tabes, since it is observed in numerous affections, spinal or non-spinal, such as Friedreich's disease and in peripheral neuritis. Sicard states that the Argyll-Robertson sign in a great majority of cases is accompanied with a lymphocytosis of the cerebrospinal fluid.

In regard to the optic atrophies, Lapersonne states that there does not exist any difference between an isolated atrophy and atrophy of the papilla. The atrophy found is one of the signs of tabes. In this way all the prominent symptoms of tabes are considered, and the final conclusion seems to be that none of them are in this sense pathognomonic to the extent that their isolated occurrence would justify the assumption of a monosymptomatic tabes.

In discussing the question of whether it would be possible to fix upon a minimum number of symptoms necessary for the diagnosis of tabes, Sicard suggests that the minimum of the signs that would be necessary would be based upon the union of three of the important evidences in

the tabetic series: Abolition of the Achilles reflexes, or knee-jerk, the Argyll-Robertson sign, shooting pains, trophic troubles, arthropathies, perforated ulcers, gastric crises and lymphocytosis of the spinal fluid. One would have to consider as pretabetic such subjects as presented only one or two of these signs. The diagnostic value of the lymphocytosis in the spinal fluid is not very great, because it indicates solely a meningitis, and not necessarily a root, or medullary lesion, and likewise it is found in various syphilitic lesions.

Finally it seemed to be the opinion of the Society that the diagnosis of tabes might be based upon its evolution, particularly in such cases in which the original diagnosis was in doubt. The diagnosis of tabes based upon the proof of therapy, or the effect of treatment, was left for future discussion.

The main result of all this mass of careful reports and studies shows that the question of the delimitation of tabes cannot be considered as solved. What was proved, however, was that certain symptoms would from that time on be studied with more precision, and that more care and criticism must be shown in the diagnosis.

Among the additional papers presented was one by Abadie, which had to do with the question of a semiological scheme for tabes. He divides the question of diagnosis into three classes:—

Class A, to which he gives the name of functional symptoms, or the evidences of presumption.

(1)   Phenomenon of pain, or paresthesia.

(2)   Symptoms of micturition, consisting of difficult or incomplete retention, with or without phases of slight incontinence.

(3)   Difficulty in erection.

Class B.—Physical symptoms, or revealing evidences of stigmata of tabes.

(1)   The Argyll-Robertson sign, complete or incomplete.

(2)   Changes in the Achilles reflexes, consisting of rapid exhaustion, unilateral loss, enfeeblement, or bilateral abolition of the Achilles reflexes.

(3)   Disturbance in knee-jerk, showing the same variations as in 2.

(4)   Symptoms of profound visceral disturbance in sensibility, consisting of hypalgesia, analgesia, more rarely hypalgesia, upon pressure of the testicles, the epigastrium, of the mammary glands, of the trachea, tongue and ocular nerves.

(5)   Disturbance in the sensibility of the deep organs, consisting of hypalgesia, analgesia, more rarely hypalgesia, upon percussion of the bones, particularly of the torsus, and tibia, upon distortion of the articulation of the toes and torsus, upon pressure of the muscles, pinching of the tendons, and particularly of the tendo Achillis.

Class C.—Cytological symptoms. The sign of the anatomical and pathological control, lymphocytosis of the cerebrospinal fluid, either in abundance or slight.

It can be seen from the résumé made in these pages that the discussion on tabes as outlined gives in one place the most complete collection of clinical pathological data on the subject that our present-day knowledge admits.

THE VALUE OF ALBUMIN MILK ("EIWEISS MILCH") IN THE NUTRITIONAL DISTURBANCES OF INFANCY.

A REVIEW OF RECENT LITERATURE.

By T. C. Hempelmann, M. D., of St. Louis.

1. Abt: Indications and Directions for the Use of Albumin Milk. (*New York Medical Journ.*, January 21st, 1911.)
2. Beck: The Treatment of Gastro-Intestinal Disorders in Infancy with "Eiweiss Milch." (*Jahrb. fuer Kinderheilk.*, 75, No. 3, p. 315, March 5th, 1912.)
3. Benfey: The Use of "Eiweiss Milch" in the Newborn. (*Jahrb. fuer Kinderheilk.*, 75, No. 3, p. 280, March 5th, 1912.)
4. Brady: Experiences with Albumin Milk. (*Journ. Amer. Med. Assoc.*, 57, p. 1970, 1911.)
5. Doeblin: Mortality Resulting from Breast Milk and "Eiweiss Milch" Therapy. (*Muench. med. Wochenschr.*, 58, p. 1753.)
6. Finkelstein and Meyer: Technique and Indications for the Use of "Eiweiss Milch." (*Muench. med. Wochenschr.*, 58, No. 7, p. 340, February, 1911.)
7. Grosser: Experiences with "Eiweiss Milch." (*Zeitschr. fuer Kinderheilk.*, 2, p. 448.)
8. Grulee: Albumin Milk in Infant Feeding. (*Amer. Journ. Dis. of Children*, Vol. 2, p. 180, September, 1911.)
9. Heiman: Albumin Milk: Its Value and Indications in the Treatment of the Diarrheas of Childhood. (Trans. New York Academy of Med., *Amer. Journ. Obstet. and Dis. of Women and Children*, Vol. 65, No. 4, April, 1912.)
10. Rollet: Polyclinic Experiences with "Eiweiss Milch." (*Berl. klin. Wochenschr.*, No. 48, p. 835.)
11. Welde: Experiences with "Eiweiss Milch." (*Therap. Monatsschr.*, Vol. 25, No. 2, p. 83, February, 1911.)

"Eiswiss Milch" (variously called albumin, casein, or protein milk by American writers) consists, briefly, of the curd from a litre of whole milk, added to one-half litre of fat-free buttermilk, plus water to make one litre, and maltose added in various amounts, according to the individual case.

It is now approximately two years since Finkelstein and Meyer, the originators of albumin milk, first published their results with this form of food, and since that time it has been given a trial in dozens of clinics, both in Europe and in this country. After this lapse of time, it seems probable that some accurate estimation of its value might be made, for the literature on the subject is voluminous. In looking over some of the more recent literature on this topic, one cannot fail to be impressed with the generally favorable attitude of most of the writers to-

ward albumin milk, even though there are still some who are not fully convinced that it has any special value. Many of the writers substantiate the claims of Finkelstein and Meyer that it is the best substitute for mother's milk so far discovered, while practically all find it valuable in at least some one of the various forms of nutritional disturbance in infancy.

In order to obtain the best results with this food, it seems necessary to adhere very closely to the directions given by Finkelstein and Meyer, not only as to the preparation of the food, but also in regard to its dosage, and the proper addition of the carbohydrates. These will be found repeated in detail in the article by Abt. The main points to be remembered regarding its proper use are that the dosage should be rapidly increased up to 180-200 c.cm. per kilogram of the child's weight, and that the carbohydrates should also be rapidly increased from the 2-3 per cent. ordinarily used at the beginning of treatment to 5-7 per cent., only reducing the carbohydrates below 2 per cent. in the very severe cases. This increase in the food quantity and carbohydrate content may be made without waiting for the stools to become normal.

Failure to obtain good results with albumin milk, Finkelstein and Meyer attribute ordinarily to one of the following errors in technique—namely, (1) using too small a quantity of albumin milk in the beginning or increasing the amount too slowly; (2) adding carbohydrates too late or in too small an amount; (3) reducing carbohydrates too much or too often on account of an apparent return of the original nutritional disturbance.

Abt, in speaking of his visit to Finkelstein's clinic, comments on the excellent results obtained here with this method of feeding which he says is "successful in nearly ever case." He also comments on the low mortality and the healthy appearance of the infants after a course of this treatment, although many of the cases would have been considered very unfavorable on admission.

Grosser reports 52 cases, with only five failures, and says the only ill effects he has noticed were occasional signs of the exudative diathesis, and, when the food was long continued, the infants became pale and anemic looking.

Rollet reports in detail his experiences with this food in the Berlin Charité Polyclinic, in cases which he regards as furnishing relatively unfavorable material, since in a clinic the cases cannot be closely watched and controlled. He used the food in 95 cases, only 56 of which can be considered, since the others either did not return or changed the food of their own accord. Of these 56 cases, 31 were "dyspepsias" mostly in children between three and six months of age in whom the diarrheas ceased within the first few days. In 11 of these cases, as an experiment, there was no carbohydrate added during the time that the albumin milk was given, and 2 of these cases died suddenly, in collapse. Otherwise the results were uniformly good. The rest of the 56 cases were classed under "intoxication," "decomposition" and "Mehlnaehrschaden" (starch nutritional disturbance) cases, in all of which the results were excellent. Two cases of "decomposition" died before sugar had been added to their diet, but these were extremely severe from the start and probably could not have been saved by any other means. All the cases of decomposition were very much under weight and had had numerous other foods tried without result, and yet these cases not only gained on albumin milk, but were later able to take the ordinary foods again. In summing up, Rollet says that in his opinion, in spite of occasional bad results, albumin

milk is an exceptionally valuable food, and adds that a food which so constantly controls severe and obstinate diarrheas, even though it cannot always ward off death, is surely a valuable therapeutic aid.

Albumin milk was originally stated to be valuable only if used in infants over eight weeks of age, yet Benfey tried it in 83 infants under three weeks of age, and came to the following conclusions: (1) With albumin milk you get better results than with any other artificial food; (2) it should be given in the amount of 150-200 c.cm. per kilo of weight; (3) the sugar should rarely be below 3 per cent., and it is usually better to start at 5 per cent. and go up to 6 or 8 per cent.; (4) maltose is better than cane or milk sugar.

Welde used albumin milk in 48 cases, and of these 25 were dyspepsias, with 23 recoveries and 2 unimproved; 20 were cases of decomposition, with 16 recoveries and 4 deaths; 3 were cases of intoxication, with 2 recoveries and one death. He concludes that this food is indispensable in pediatrics.

Grulee reports 25 cases of nutritional disorders (all chosen because of their severity, and his conviction that they would not get along on other foods) with 18 recoveries, 3 failures and 4 deaths. Of the deaths only 2 were uncomplicated nutritional disorders, and of the failures no infant was on albumin milk longer than twelve days. Fifteen of the 25 were four months or under, and most were marantic.

In comparing the results obtained with breast milk and the new food, Doeblin gives the following statistics: Of 37 very severe cases fed on breast milk, 20 died (14 of these during the first week's treatment) and 17 got well—that is, about three-fifths died and about two-fifths recovered. Of 51 equally severe cases treated with albumin milk, 33 died (about 60 per cent.), and of these, 25 died within the first week of treatment, and these were so severe he believes nothing could have saved them. He thinks the foregoing statistics sufficiently indicate the value of albumin milk, and believes that in some cases it is superior to breast milk.

Brady reports 20 cases in which 5 marantic babies made brilliant recoveries, one died, and all the rest made excellent recoveries.

Beck used albumin milk in 175 cases, 110 of which were dyspepsias, 8 intoxications, 4 enterocolitis, and 17 decompositions. Of these, 12 died, and he adds that he does not think anything could have saved them, because 4 were moribund when admitted, 4 had, on admission, a bronchopneumonia which was the cause of death, 3 were the severest kind of atrophy, and one was a bad case of intoxication. He believes this food to be the best of all the artificial foods.

Heiman, before the New York Academy of Medicine, reported 42 cases, 20 of a very severe type, with 9 deaths, 4 of these practically moribund on admission (dying within three days). He concludes albumin milk represents a distinct advance in the therapeutics of these conditions. In discussing this report, Morse said that his experience had been limited, and he could not explain the action of this food, but he had seen it do good sometimes. Talbot, Kerley, Chapin and Koplik also discussed this paper, Talbot reporting very favorably and Chapin saying he thought it had a restricted value in certain cases. Kerley believed it more easily assimilated than cow's milk by older children with acute intestinal disturbances, and Koplik said he was not especially impressed with the results from albumin milk.

DIAGNOSTIC AND THERAPEUTIC NOTES.

FEVER AND SALVARSAN.—McIntosh, Fildes and Dearden (*Zeitschr. fuer Immun.*, No. 2, 1912). The intravenous injection of salvarsan is usually followed by a very constant symptom-complex. Within an hour, the patient has a chill followed by fever, headache, backache, nausea, vomiting, rapid pulse and respiration. In some cases these symptoms may reach an alarming grade culminating in collapse.

In investigating the cause of this phenomenon, the writers have made some astonishing observations. They found it not to be due to the salvarsan, since the saline solutions, used for dissolving it, were followed by the same manifestations if injected intravenously without the salvarsan. Neither was it due to the salt, since no difference was noted whether a 0.9 or a 0.6 per cent. NaCl solution was used. Further investigation showed that the distilled water used was rather rich in bacteria. These were killed when the water was sterilized, but their dead bodies acted as toxines, producing the fever and other disturbances when injected intravenously. If distilled water, filtered through porcelain, or sterilized immediately after distillation, was used in the preparation of the salvarsan solution, a febrile reaction never occurred. The only exception was 2 cases of extremely florid syphilis, in which fever occurred after the injection of salvarsan prepared with non-toxic water. In these cases, the destruction of great numbers of spirochætæ may have been responsible for the fever.

Obviously, if these observations prove to be correct, they represent a great technical advance in the art of salvarsan therapy.

THE VACCINE THERAPY OF ACNE.—Allen (*Journ. Vaccine Therap.*, No. 1, 1912). Before undertaking the treatment of any case it is essential that all predisposing causes be removed. Attention must be paid to the bowels, the diet of each patient regulated, "carious teeth must be stopped or extracted, crowns and bridges removed, and pyorrheic gums receive attention, while follicular tonsillitis should be adequately treated." Any seborrhea of the scalp must be dealt with, and care be taken to keep the skin clean; the acne expressor may be required. The patient is then ready for vaccine treatment. Whenever possible, an autogenous vaccine should be secured, although good results have been obtained by using stock vaccines both of the acne bacillus and the staphylococcus albus. Begin with doses (five millions of the former, 100 millions of the latter) in combination. Injections are best given in the buttock, flank, or one and a half inches below the centre of the clavicle. In twenty-four to forty-eight hours there will be either definite improvement or a slight aggravation. Allen expresses his preference for such doses as will slightly aggravate the symptoms for forty-eight hours, followed by

improvement lasting a week. Do not attempt to proceed too quickly. "In an average case the dose of 100 million staphylococcus and five million acne is repeated four or five times, at weekly intervals, and then increased to 250 millions and more; gradually increasing until a maximum (if necessary) of 2,000 million staphylococci and twenty million acne is reached." With the higher doses the injections must be less frequent. A severe case lasts six to twelve months. Allen is inclined to regard 50 per cent. of complete and lasting cures as all that is to be expected in this form of treatment.

———

TREATMENT OF ACUTE ARTICULAR RHEUMATISM.—Le Gendre and Martinet (*Journ. de Méd. et de Chir.*, No. 3, 1912). In their excellent book, "Thérapeutique usuelle des maladies de la nutrition," Le Gendre and Martinet devote one chapter to the treatment of rheumatism. They set up the following rules for the use of sodium salicylate:—

1. The salt should be given dissolved in a considerable amount of water so as to minimize its irritant properties.

2. Divide the daily dose into portions, which should be given every two or three hours, day and night, on account of the rapid elimination of the drug.

3. The full daily dose is, on the average, 6 to 8 grm. for an adult and 0.4 grm. per year for children.

4. This full dose should be given daily as long as the fever lasts and for three days after the temperature has become normal. It may then be gradually reduced up to the twentieth day when, if there has been no relapses, the case may be considered terminated.

Before and during the administration the urine must be examined. An albuminuria of any considerable degree contraindicates these large doses of salicylate. It is also necessary to assure oneself of the regular excretion of salicylic acid as long as the drug is given (a Burgundy red color appears in the urine upon the addition of ferric chloride).

———

AN EARLY SYMPTOM OF EXTRA-UTERINE PREGNANCY.— Sololwij (*Zentralbl. fuer Gyn.*, No. 5, 1912). A symptom, which the author found present in 2 cases of extra-uterine pregnancy, and which led him to operate immediately, was the occurrence of a doughy resistance in Douglas's cul-de-sac. He believes that whenever a suspicious tumor is found to one side of the uterus and a doughy mass makes its appearance in the cul-de-sac, while the patient is under observation, immediate operation is indicated. The cause of the mass, referred to, is a small collection of blood in the cul-de-sac.

———

SOME POINTS IN THE DIAGNOSIS AND TREATMENT OF CHRONIC DUODENAL ULCER.—Moynihan (*Lancet*, January 6th, 1912). Moynihan emphasizes four cardinal signs of duodenal ulcer:—

1. Anamnesis. This is of prime importance and often by itself enables one to make a positive diagnosis. Its chief feature is the "hunger-pain."

2. Gastric hyperacidity, present in 40 per cent. of the cases. A permanent hyperacidity indicates an organic, not a functional affection.

3. Increased pyloric peristalsis, best observed by means of the x-rays after a bismuth meal. The pain usually occurs when most of the food has reached the duodenum. A delayed emptying of the stomach is rare in early duodenal ulcer.

4. Blood is usually found in the stool, if the latter is examined daily for a considerable period of time.

Occasionally the evidence of stenosis, due to scar-tissue, may be used to support the diagnosis.

As regards treatment, Moynihan, as is well known, advocates the performance of gastro-enterostomy. The mortality of the operation is low (1.3 per cent.), but perforation has been observed several months after operation.

He believes that in a large proportion of the cases, both gastric and duodenal ulcer are due to inflammatory disease elsewhere, chiefly in the appendix. The latter should be investigated in all cases that come to operation. In his last fourteen operations for duodenal ulcer, he has removed a diseased appendix twelve times.

EPIGASTRIC PAIN IN DIABETES.—Lereboullet (*Progrès Méd.*, December, 1911). The importance of recognizing the fact that attacks of epigastric pain, even simulating "gastric crises," are sometimes forerunners of diabetic coma, has been recently pointed out by Lereboullet. Two cases are narrated by the author of persons suffering from diabetes attacked with pains so severe that the question of the imminence of a possible grave abdominal emergency arose. In each case, however, the presence of dyspnea, together with the fact that the patients were known to be diabetic, suggested the imminence of diabetic coma, and in each case coma did, in fact, ensue with rapidly fatal results. Lereboullet thinks that such pain may be due to some toxic affection of the solar plexus, and points out the importance of recognizing it so that early and adequate alkaline treatment may be instituted. In Lereboullet's cases vomiting does not seem to have been present; in some, reported by other observers, it is said that vomiting has been so severe as to suggest the necessity of operating for the relief of intestinal obstruction.

PRACTICAL MEMORANDA.

THE ACIDOSIS INDEX.

A CLINICAL MEASURE OF THE EXCRETION OF THE ACETONE BODIES.

By T. Stuart Hart, M. D., of New York.

In following quantitatively the output of acetone bodies in diabetes mellitus and other conditions of abnormal metabolism, the following method has been found to afford information of much value and requires a minimum of time and skill.

1. Test the suspected urine for acetone by means of Lange's test in the following manner. In a test-tube containing 5 c.cm. of urine dissolve a few small crystals of sodium nitroprussiate, add 1 c.cm. of glacial acetic acid; overlay this mixture with 3 c.cm. of strong ammonium hydroxide. If acetone is present a purple ring will develop at the point of contact between the ammonia and the underlying mixture.

2. If the above test shows the presence of acetone, make a further quantitative test for diacetic acid. For this purpose the following solutions are necessary:—

   (a) The "standard solution" consisting of ethyl-aceto-acetate 1 c.cm.; alcohol 25 c.cm.; and distilled water to 1,000 c.cm.

   (b) Ferric chloride solution consisting of 100 grm. ferric chloride dissolved in 100 c.cm. of distilled water.

Take two test-tubes of equal calibre ($\frac{1}{2}$ in. in diameter); put in one 10 c.cm. of the "standard solution" and in the other 10 c.cm. of the urine to be tested; add to each 1 c.cm. of the ferric chloride solution; allow the tubes to stand a couple of minutes to permit the color to develop fully, and then compare the color of the two test-tubes when they are held between the sky and the eye. If the tube containing the "standard solution" is of a lighter shade than the urine mixture, dilute this with distilled water until the colors match, noting the volume to which it has been necessary to dilute the urine mixture.

By the use of these reactions we obtain a numerical value for the "acidosis index per litre" in accordance with the following schedule:—

	Acidosis Index per Litre
Test 1 positive ⎱ = ...	0.5
Test 2 negative ⎰	
Test 2 positive	

Volume of Urine Solution.

		Acidosis Index per Litre
10 c.cm.	=	1.0
15 c.cm.	=	1.5
20 c.cm.	=	2.0
50 c.cm.	=	5.0
100 c.cm.	=	10.0

(Intermediate volumes have a proportional index.)

In order to obtain the "acidosis index" proper, we multiply the value of the "acidosis index per litre" by the amount of urine in litres passed in twenty-four hours. For example: A patient passed 3,200 c.cm. urine in twenty-four hours. When 10 c.cm. of this was treated as described before, it was found necessary to dilute this to 75 c.cm. in order to match the standard; his "acidosis index per litre" was therefore 7.5 and his "acidosis index" was 7.5x3.2=24.

The "acidosis index" approximately corresponds in value to the total acidosis estimated in terms of β-oxybutyric acid by the more exact chemical methods, i. e., an "acidosis index" of 10 corresponds approximately to a total acidosis of 10 grm. of β-oxybutyric acid; an "acidosis index" of 25 equals approximately 25 grm. of β-oxybutyric acid, etc. For the more detailed evidence upon which this clinical quantitative method rests, those interested are referred to my earlier papers on the subject.

In utilizing this method it should be borne in mind that it is not an exact measure, but it is sufficiently accurate to gauge the variations of acetone-body output for clinical purposes.

A PRACTICAL CYSTOSCOPE STAND.

By Arthur Stein, M. D., of New York.

The cystoscope stand I am about to describe has for many years proved in my practice an exceedingly practical instrument, so that it may be recommended to the profession. In former years the task, of demonstrating to students normal and pathological conditions of the bladder, was fre-

quently very irksome and inconvenient, because the adjusted place often disappeared from the field of vision owing to the unsteadiness of the hand holding the cystoscope. This difficulty is at once overcome by the use of this stand. The cystoscope being adjusted for inspection of the

desired place, it is fixed in the stand, and a number of students may then make the inspection at leisure.

Another advantage consists in the fact that there is no difficulty whatever in collecting the urine of each kidney separately, the stand being provided with special mechanical devices for holding two test-tubes in the desired position, as will be seen from the illustration.

This stand is in many ways an improvement on the one originally devised by Stoeckel, the "father of gynecological cystoscopy," and has always proved very serviceable to me in practice during long and continued use.

The stand is made of nickel-plated metal, its height is adjustable, and at its upper end carries a horizontal rod which again can be adjusted in a longitudinal direction and rotated around its transverse axis. One end of the rod carries on ball-bearings two small vertical pillars, which at their upper ends encircle another ball-bearing device that contains the clamp for holding the cystoscope. It will be easily seen, therefore, that the cystoscope can be fixed and moved in any desired position and be kept in that position for any length of time.

If it is desirable to collect the urine of each kidney separately, the two test-tubes, which are held between two specially provided arms, are used, the catheter ends being conducted into them separately. In this way I have often made examinations lasting for half an hour, or more, without the slightest inconvenience to the patient.

It may be added, that an additional electric light attachment could be fitted at any convenient place, should the same be necessary. The lamp could be of colored glass or partially hidden by a reflector so as to concentrate the rays of light away from the operator and on to the external genitals. Furthermore, there could be made an attachment in the form of a tray or a glass plate, which would swing from the stand proper, on to which all the necessary instruments could be placed.

MODIFICATION OF GRAM'S STAIN.

By Charles L. Klenk, M. D., of St. Louis.

The following is a simple stain of diagnostic import, does not spoil and will keep indefinitely, is very easily prepared, and the entire procedure requires but thirty seconds. The results are absolute.

This stain can be used for all bacteria, and is especially valuable for staining the diphtheria bacillus.

1. Flood smear on cover-glass with a 1 per cent. carbolic crystal violet solution.

10 c.cm. saturated alcoholic solution crystal violet.

90 c.cm. of a 1 per cent. carbolic (aqueous solution) ; allow this to act for ten seconds.

2. Flood smear without washing, with a 1/100 Lugol's solution for ten seconds.

1 grm. iodine.

2 grm. potass. iodide. Lugol's solution.

100 c.cm. water.

Wash with 95 per cent. alcohol for ten seconds. Wash quickly with water. The Gram positive bacteria will be stained a bluish-black. If a counterstain is wanted, especially for the diphtheria bacillus, a weak solution of aqueous eosin can be used for a few seconds. The body of the bacillus will be stained pink, and the granules black.

SIMPLIFIED SALVARSAN APPARATUS AND TECHNIQUE.

By J. A. MATLACK, M. D., of Longmont, Colo.

Any practitioner who can follow an absolutely aseptic technique, who can accurately enter a vein with a needle, and who can carefully follow directions for preparation of the drug, is competent to administer salvarsan intravenously.

The necessary equipment may be complicated and expensive, or it may be composed of a few simple articles such as may be assembled in the office of almost any physician. Syringes, stop-cocks, etc., are superfluous. The following articles comprise all that is needed:—

3 glass-stoppered pint bottles,
1 glass-stoppered 4 ounce bottle,
1 ounce bottle with cork perforated by dropper,

Small glass funnel with three layers sterile gauze tied over top.

Glass irrigator, 3 ft. rubber tubing, clamp for same, and needle for entering vein.

This outfit is boiled for a half hour, and rinsed with sterile distilled water. Four ounces fresh distilled water are boiled in a flask or enameled pan and poured through the funnel-filter into the 4-ounce bottle. Two pints 0.5 per cent. saline solution are similarly freshly prepared and filtered into two of the pint bottles. The other pint bottle is for mixing the salvarsan solution, and should be marked with a file, before boiling, to the level attained by 40 c.cm. of water and also to the level attained by 300 c.cm., the total quantity of solution to be used when the usual dose of 0.6 grm. is given. Several ounces of 15 per cent. caustic soda solution should be accurately prepared and a few drams sterilized and filtered into the ounce dropper bottle.

In preparing the medicine there should be no variation from the printed instructions which accompany each phial. Into the file-marked bottle there should be poured enough sterile distilled water to come exactly to the lower file mark. The salvarsan should then be added and brought into solution by vigorous shaking, the glass beads called for in the directions not being required. The solution should then be neutralized by addition of 23 or 24 drops caustic soda solution, and the sterile salt solution added to the level of the upper file mark, and the completed solution again shaken. The bottle containing the salvarsan and the extra bottle of saline solution should be placed in a bowl of warm water for five or ten minutes before the injection.

The irrigator should be so arranged that the top of the solution will be 18 to 24 in. above the patient's arm, and should be covered with a layer of sterile gauze for filtration. The arm should be sponged with ether followed by alcohol, and a rubber constrictor applied above the elbow sufficiently tight to show the veins distinctly. A vein is then selected and the needle inserted into its lumen, this being checked up by the prompt flow of blood. The constrictor is then removed. About 8 ounces of saline solution is poured into the irrigator and part of it allowed to run out of the rubber tubing to rinse it thoroughly, and the tubing is then connected with the needle. When nearly all the saline solution has gone into the vein, the salvarsan solution is poured into the irrigator and flowed into the vein in about five or ten minutes' time. Just before the last of the salvarsan has entered the tube, 2 or 3 ounces of saline solution may be added to insure the complete dosage entering the vein. The needle is then withdrawn and a small pad applied to the puncture.

The treatment may be given in the physician's office, but the patient should be kept under observation for a few hours, as considerable nausea and a certain degree of prostration may be expected.

SOCIETY PROCEEDINGS.

ST. LOUIS MEDICAL SCIENCE CLUB.

The regular meeting of the St. Louis Medical Science Club was held at the Barnard Free Skin and Cancer Hospital, Tuesday, April 9th, at 8:30 p. m. The following was the program of the evening:—

1. Demonstrations: (*a*) The Use of Clark's Stereotaxic Instrument for the Production of Cerebral Lesions......................E. Sachs.
   (*b*) Kidney Lesions Produced by a Yeast Isolated from a Case of Human Cancer...M. Fleischer.
2. The Relationship of the Sino-Auricular Node to Auricular Rhythmicity......................................V. H. K. Moorhouse.
3. Studies in Respiration.................................D. Edsall.
4. Heredity of the Susceptibility to Inoculation with Cancer........................Leo Loeb and Moyer S. Fleischer.

<div align="right">(Signed) W. E. GARREY, Secretary.</div>

RELATIONSHIP OF THE SINO-AURICULAR NODE TO AURICULAR RHYTHMICITY.

By V. H. K. MOORHOUSE, B. A., M. B.

The specialized tissue lying at the junction of the superior vena cava with the right auricle has been affirmed by some to have specific properties as regards cardiac rate. Perfusion experiments on dogs' hearts, in which the effect of excision or clamping the nodal area on auricular rate was studied, do not support this view. Removal of the area containing the sino-auricular node did not give the uniform results one would expect if the node is to be regarded as specific for cardiac rate. In some experiments removal of all the nodal tissue together with extensive amounts of the musculature of the sinus region produced no slowing of auricular rate. Histological examination confirmed the presence of the node in such areas removed. In other cases removal of an area not containing nodal tissue was effective in producing a marked slowing of auricular rate. Where comparison of rhythmicity between the node-bearing area and one not containing nodal tissue was made, no predominance of rate of the node-bearing area was observed. The conclusion from these experiments is that the sino-auricular node is not specific as regards cardiac rate, but that some other portion of the highly rhythmical sinus region is amply capable of determining cardiac rate. The localization of the origin of the heart-beat in the sino-auricular node is therefore a fallacy.

HEREDITY OF THE SUSCEPTIBILITY TO INOCULATION WITH CANCER.

By Leo Loeb and Moyer S. Fleischer.

Tyzzer observed that in crossing Japanese waltzing- and American white mice and inoculating the hybrids with a tumor found in a Japanese mouse, the hybrid F1 behaved like Japanese mice, while F2 and F3 behaved like American mice.

We crossed American white mice with two strains of European white mice, used a tumor of an American mouse, and obtained similar results as Tyzzer.

The results of Tyzzer and ourselves are, therefore, not dependent upon the peculiarity of a special strain of mice and of a special kind of tumor used, but dependent evidently upon the factors which determine the fitness of a certain soil for tumor-growth and are, therefore, of general significance. If we wish to apply Mendel's laws of alternative heredity to these findings, we will have to assume that the susceptibility to growth of inoculated tumors does not correspond to a single factor, but to a combination of factors in which, probably, a special kind of coupling of some of the factors complicates the process.

From the fourth hybrid generation on we find a sudden recovery, the number of percentage-takes increases considerably and sharply.

The decline in the curve noticeable between the first and second hybrid generations is also present, if we cross hybrid F1 back either to American or European mice. Otherwise these new crosses are intermediate between hybrid F1 and American (respectively European) mice. In the following generations the curve representing the percentage of takes in these crosses remains constant. These investigations are being continued in various directions.

THE PSYCHOPATHY OF COLERIDGE.

The following excerpt is taken from Dr. Roger Dupouy's recently published book, "The Opiomaniacs: Eaters, Drinkers and Smokers of Opium" (Les Opiomanes Mangeurs, buveurs et fumeurs d'opium, Félix Alcan, Paris), and no doubt will interest all medical men who have given some thought to the vagaries of that strange figure in English literature —Samuel Taylor Coleridge:—

Coleridge was the thirteenth child of an educated clergyman, who was intensely absent-minded and pursued an existence completely detached from things that are mundane. Passionately devoted to theology, he continually soared above matters, which for the every-day sort of man cannot be neglected, if life is to be tolerable. But Coleridge's father thought otherwise.

This father, who was "pathologically" original, brought up his children in an atmosphere that reeked with liberty, exercised absolutely no discipline over them, treated them even at a tender age as men, and conversed hours with them on the most abstract subjects. This sort of education, which at first sight would seem the worst sort to give a child, perhaps did much to develop the brilliant mental faculties of the future poet which were already manifest at an early age; but while admitting this to have been an advantage, one cannot but deplore the fact that his childhood was greatly spoiled. The latter point is emphasized in a letter which he wrote at twenty-four in which he regrets that he never was a child, in fact, never talked like a child.

Coleridge devoured all the books in his father's library, reading without discrimination everything that came to hand. His imagination was abnormally exalted by what he read. Thus, when at the age of six he read one of the tales in the "Arabian Nights," the impression was so indelible that he was haunted by spectres whenever he happened to be in the dark. Later on he attributed his penchant for revery and his hatred of physical exercise to the influence of his early readings. On account of this early indulgence in all sorts of books, the poet himself says he not only became a dreamer, but acquired a disposition contrary to all physical activity; he was unreasonably capricious and passionate, and as he could not play any games and moreover was lazy, he fairly detested all boys. While this is true to a certain extent, one should not jump at conclusions and say that his browsing among books at an early age was altogether responsible for the defects in his character or for his peculiar mentality; rather should we say that what he read was merely the result of certain tendencies hereditarily avid of dreaming, of dwelling on the infinite, of the life spiritual. Before he developed into a dreamer, the germ was in him that impelled him toward revery, and instinctively he felt himself drawn to those books in harmony with his nature.

Coleridge, unreasonably capricious and passionate, was at all times decidedly impulsive. Proofs of this impulsiveness abound; and to illustrate them his diverse escapades should be mentioned. One day, ac-

cording to the poet, after a furious dispute with one of his brothers, he fled from his father's house, and passed the night on the banks of the river Otter during a violent storm, repeating his prayers and at the same time getting grim satisfaction from the thought that his mother would be in deep despair on account of his disappearance. On returning home with his clothes thoroughly soaked, he was ill. Later, apparently on account of a love affair, he suddenly left Cambridge University and enlisted in a regiment of the king's dragoons at Reading, though a fervent and enthusiastic advocate of peace with a horror of soldiers and horses, an indolent dreamer ignorant of discipline, too indifferent to keep a gun clean and unable to sit a horse. "This was," says Aynard in "La vie d'un poete, Coleridge," "a pressing and absolute need for moral solitude, the impulse of the dreamer similar to the motive that caused him to flee his home when a child, and quit his family and friends when a man, to find work in Malta, for which he was as little fitted as his enlistment with the king's dragoons."

This impulsiveness, added to the exceptional mental faculties with which nature had endowed him, was the cause of driving Coleridge into the most diverse directions in all his work. Even a cursory examination of his literary undertakings will show this. Was he not poet and philosopher, art critic and publicist, lecturer and preacher?

His enthusiasm was of a deceptive mobility; he became excited on the slightest provocation, but this condition vanished with the same suddenness which characterized its onset. All subjects attracted and repelled him by turns; hardly had he taken up a subject when he dropped it, to pass to another or to relapse into his dreamy state. He became greatly interested in medicine when his brother Luke was a medical student, and when he got to know a certain bootmaker, he wished to learn his trade. At the university, theology and metaphysics had an irresistible attraction; his enthusiasm rose to a frenzy for the French Revolution and the mystic reforms of Priestley and Tom Paine; a little later he was enamored of a project that bordered on the burlesque, "the return to Nature," elaborated by his friend Robert Southey, and which had for its object that about a dozen couples should embark for America, there to found a new and regenerate society, a republic of sages based on the Utopian idea of liberal collectivism, with the understanding that during the first months of its organization pantisocracy should be preached so as to win over recruits. Coleridge thereupon married Sarah Fricker for no other reason than to be included among the couples who were to compose this strange colony. At the same time he took up politics, opposed Pitt with withering scorn, and elaborated, in the guise of a political platform, a philosophical evangel tinctured with revolutionary doctrines, something that was obscure, complicated, pretentious and blatant, but not devoid of talent and high ideals. He soon abjured democracy, developed into an extreme Christian Socialist, and passed at once into the rôle of mystic evangelist. But this did not prevent him from being by turns a poet of rare delicacy and an ardent polemist, the prospective founder of various journals and an agriculturist, a patriot after declaring himself a revolutionist of the darkest type, an enthusiastic admirer of German philosophy and the various German dialects, keen on translating Schiller into English and writing a life of Lessing, encyclopedist, and finally a melancholic enwrapped in religious philosophy.

On account of possessing mental faculties that were exceptionally diverse and strong, a memory so marvelous that he could repeat in the evening

word for word of what he had read in the morning, an erudition that was encyclopedic on account of the truly vast readings of this cormorant of the libraries, a florid eloquence that stamped him as the most spirituelle romancer of his time, a remarkable gift of fascinating everybody with whom he came in contact—a fascination that commanded sympathy and devotion, Coleridge appeared in the eyes of his friends to be a prodigy, an "intellectual monster," to employ an expression used by Aynard, and which, while descriptive of his superior mental faculties, carries with it the other meaning of intellectual abnormality. Coleridge was always abnormal, even before he became addicted to opium, and many are the defects that are apparent upon analysis of his mind.

His sensibility was disordered, as he says himself, and his imagination ran riot. He was fantastic, eccentric, extravagant; witness the absurd Utopian ideas of pantisocracy with which he attempted to indoctrinate his friends who thought him semi-insane. He was always the dreamer with a soul avid of symbols, but darkened by a mysticism which impelled him to pursue the strangest chimeras, to run foul of obstacles, forgetful of the material side of life, and for whom "the world was not the real world as we know it, but a fantastic creation of the poet's mind," to quote Aynard again.

BOOK REVIEWS.

RECENT METHODS IN THE DIAGNOSIS AND TREATMENT OF SYPHILIS. (The Wassermann Serum Reaction and Ehrlich's Salvarsan.) By Carl H. Browning, M. D., Lecturer in Clinical Pathology University of Glasgow. Director Clinical Research Laboratory Western Infirmary Glasgow, and Ivy McKenzie, M. A., B. Sc., M. B., Ch. B., Director, Western Asylum's Research Institute Glasgow. Physician to the Out-Patient Department Western Infirmary Glasgow. In Collaboration with John Cruikshank, M. B., Ch. B., Walter Gilmour, M. B., Ch. B., Hugh Morton, M. B., Ch. B., with an Introduction by Robert Muir, M. A., M. D., F. R. S., Professor of Pathology in the University of Glasgow. Philadelphia and New York: Lea and Febiger. 1912.

A critical review of the Wassermann reaction and of the literature on salvarsan is contained in this book, together with the authors' personal investigations upon these subjects. The literature both upon the Wassermann reaction and the salvarsan method of treatment has become so vast, that it would be impossible for any practitioner to obtain a proper idea of the subject, on account of the time it would take to review the amount of work done.

In this volume, the writers compass and critically abstract the whole of this vast literature; furthermore, they have put it in such shape that facts can be readily and easily grasped. Another great advantage of the volume is that it is not highly technical, and can be understood by the ordinary reader.

This volume, together with the one on Syphilis by McIntosh and Fildes, gives one a very complete command of the modern literature of syphilis—namely, the theories of immunity; animal experimentation; spirochæta pallida; the Wassermann reaction and the salvarsan method of treatment.

One fact stands out plainly in the volume of Browning and McKenzie, and that is that the fatalities from salvarsan in the large majority of instances were due to other causes than the effect of the drug upon the system; and that salvarsan is by far less dangerous than an ordinary anesthetic. The fatal cases occurring in literature, reviewed by them, plainly point to the necessity of a thorough physical examination before salvarsan is administered; and that severe heart or aneurysmal complications are absolutely contraindications.

The volume under discussion should be read by everyone who is treating syphilis, and especially by those who are using the Ehrlich method of treatment.

DIFFERENTIAL DIAGNOSIS. Presented Through an Analysis of 385 Cases. By Richard C. Cabot, M. D., Assistant Professor of Clinical Medicine, Harvard University, Medical School, Boston. Second Edition, Revised. Profusely Illustrated. Philadelphia and London: W. B. Saunders Company. 1912. Price, $5.50.

In most textbooks on clinical diagnosis, the diagnosis is given (usually as a chapter-heading), and the signs and symptoms characterizing the condition are enumerated and described. This situation is obviously the reverse of that met in actual practice. There we have a group of signs and symptoms, presented or elicited, and from them must deduce a diagnosis. From this point of view, the question of differential diagnosis occupies the foreground, and it is from this viewpoint that Dr. Cabot approaches the subject. Each chapter is devoted to some "presenting symptom" (headache, jaundice, vomiting, coma and the like), which is either the patient's chief complaint or the most striking sign on first seeing him. Under each heading a number of difficult but not insoluble cases are presented as regards anamnesis, physical and laboratory findings, and subsequent course. The significance of the observed phenomena is discussed and the diagnosis elicited, usually by exclusion. In connection with each chapter there is an illuminating discussion of the significance and interpretation of the symptoms to be taken up. The style is beautifully lucid and one reads one case report after the other with never flagging interest. We have seen few books that are at once such fascinating reading and so full of practical information.

A TREATISE ON TUMORS. By Arthur E. Hertzler, M. D., Ph. D., Associate Professor of Surgery in the University of Kansas, etc. Illustrated with 538 Engravings and 8 Plates. Philadelphia and New York: Lea and Febiger. 1912.

"The aim of this book is to give students and practitioners a guide to the proper recognition of tumors. The excuse for the book is that no existing treatise on the subject combines science with art; all others are too broadly scientific or too broadly clinical." If then the author succeeds in presenting from these combined viewpoints a practical treatise, the book should receive hearty welcome and unstinted praise. After a careful review it is our opinion that it is a good book without being a perfect one. For a book which aims at science, the rarer tumors receive too scant attention. The illustrations are copious, and, on the whole, excellent, but are by no means evenly distributed. We note 25 photographs of patients with epithelioma of the face, but no histological pictures of any of the tumors presented; and it seems to us that students can acquire knowledge of tumors far better by careful clinical observation of one case, followed by gross and histological pathological study, than by looking at photographs of a large series. In fact many of the photographs could be omitted without damaging the book. The use and abuse of frozen sections in diagnosis is not mentioned. On page 35 mention is made of "a ferment with power to retard the digestion of albumin," by which is probably meant antitrypsin—the opposite to a ferment.

Perhaps it is unfair criticism to say that in a book published in 1912 only a handful of references to the literature of 1910 is seen; we realize the tremendous labor involved in producing the volume. On the whole the volume will probably be a useful addition to the student's library.

SYPHILIS FROM THE MODERN STANDPOINT. By James McIntosh, M. D. (Aberd.), Grocers' Research Scholar and Paul Fildes, M. B., B. C. (Cantab.), Assistant Bacteriologist to the London Hospital. Illustrated. London: Edward Arnold (Longmans, Green and Co., New York). 1911.

This is one of the international medical monographs, and is an exceedingly valuable addition to the literature on syphilis. The first part of the book comprises a rather thorough discussion on the history of syphilis; the second part, a description of spirochætæ in general and the spirochæta pallida in particular, giving a description of their biological characters, the newer methods of recognition, and a very thorough review of experimental syphilis in animals.

The part of the book of most value to the general reader is the thorough way in which the authors review the literature upon the question of immunity in syphilis. The second half of the book is devoted to the Wassermann reaction and the treatment of syphilis by "606."

Although the book was written by laboratory workers, and not clinicians, yet it is from the laboratory, and not from the clinician, that the modern advances in syphilis have been made; and it is to the laboratory and its investigators that we look for future knowledge of this disease.

The life cycle of spirochætæ is yet to be solved, together with the mooted question in relation to immunity, and as to the various curious phenomena produced by the syphilitic virus.

A book, such as the one written by McIntosh and Fildes, gives the general medical public the advantage of becoming familiar with the prevailing methods and problems encountered. Therefore, such a monograph as this one should reach a large and appreciative circle.

SECOND REVIEW OF SOME OF THE RECENT ADVANCES IN TROPICAL MEDICINE. Hygiene and Tropical Veterinary Science, Being a Supplement to the Fourth Report of the Wellcome Tropical Research Laboratories at the Gordon Memorial College, Khartoum. By Andrew Balfour, M. D., B. Sc., F. R. C. P., Edin., D. P. H. Camb., Director; and Captain R. G. Archibald, M. B., R. A. M. C., Attached E. A., Pathologist and Assistant Bacteriologist; in Collaboration with Captain W. B. Fry, M. R. C. S., L. R. C. P., R. A. M. C., Attached E. A., Protozoologist and Assistant Bacteriologist; and Captain W. R. O'Farrell, L. R. C. P. and S. I., R. A. M. C. London: Baillière, Tindall and Cox (Toga Publishing Co., New York). 1911.

Under the caption of Tropical Medicine one might imagine that only diseases common to the tropics and rare in other regions would be discussed; but fortunately in this volume the interpretation of the terms is much broader. Ty-

phoid fever, meningitis, and syphilis receive as much attention as mycetoma, Malta fever, or sleeping sickness; and all are fully discussed. The "Review" aims to be a comprehensive record of the present state of knowledge of all diseases seen in tropical countries; it really is more than it claims to be. Not only are diphtheria and dengue brought up to date, but such matters as vermin and water are treated in a manner as scientific as interesting. The book is large, well printed on good paper, and yet is very light in weight. The price is so small for the value that we believe the book ought to be in the library of every physician who wishes to keep abreast of the times. We heartily congratulate everybody connected with the editing and publishing of this volume.

HANDBOOK OF MENTAL EXAMINATION METHODS. By Shepard Ivory Franz, Ph.D., Scientific Director and Psychologist, Government Hospital for the Insane, Professor of Physiology, George Washington University. With 33 Figures and Diagrams. New York: The Journal of Nervous and Mental Disease Publishing Co. 1912.

In No. 10 of the Nervous and Mental Monograph Series, Franz has made a very praiseworthy attempt to present the data of mental examination methods. The value of such an attempt lies chiefly in the fact that its information is difficult to obtain in the larger textbooks of psychiatry or psychology, in any one place. It is not a question of the practical utility as much as the outlining of the general scheme of the evolution of mental inquiry. One is frequently face to face in the study of mental diseases with the problem of how to translate the mental state of the patient into descriptive phrases, and how to present them so that somebody else might understand just what defects in the mentality of the individual are apparent to the investigator. Franz has shown in a simple way that it is possible to record data of mental diseases as data in regard to purely physical diseases are recorded; and if one is careful to select those methods which are simple of application, the resulting reactions will form a body of descriptive recording which is of undoubted value.

As in most monographs which are published from the Nervous and Mental Disease press, this finds for itself a very practical place, and neurologists should be grateful to the editors of this series for placing within their reach methods which have up to this time been for the most part lacking, or difficult to find.

REFRACTION AND VISUAL ACTIVITY. By Kenneth Scott, M. D., C. M., F. R. C. S. Edin., Consulting Ophthalmic Surgeon to St. Mary's Hospital for Women and Children, London, E.; Late Lecturer on Ophthalmology West London Post-Graduate College; Professor on Ophthalmology, Egyptian Government Medical School; etc. With sixteen illustrations and a colored plate. New York: Rebman Company. 1911. Price, $1.75.

This little book is intended "for the general practitioner who feels the need of a fuller acquaintance with the errors of refraction and their correction and who finds it difficult to attend the post-graduate course of instruction on the subject." It is greatly to be feared that the author has failed of his purpose to instruct the general practitioner in the "art" of refraction. To be sure, certain methods in general use are broadly sketched, but there is lacking a discussion of the many details of this difficult "art," without attention to which failure in a certain large proportion of cases is inevitable. The reviewer cannot conceive that the most earnest perusal of the various chapters would enable a practitioner to fit correctly any but the least complicated case of hyperopia or presbyopia. A chapter on the medical inspection of the eyes of school children, and another devoted to a consideration of the visual requirements in public and other services in the United Kingdom, the Continent of Europe, Australia and Japan are appended.

THE DIAGNOSIS OF NERVOUS DISEASES. By Purves Stewart, M. A., M. D. Edin., F. R. C. P., Physician to Out-Patients at the Westminster Hospital; Joint-Lecturer on Medicine in the Medical School; Physician to the West End Hospital for Nervous Diseases, and to the Royal National Orthopedic Hospital; Consulting Physician to the Central London Throat Hospital. Third Edition, Revised and Enlarged. New York: E. B. Treat and Co. 1911. Price, $4.50.

The third edition of Purves Stewart on the diagnosis of nervous diseases fulfils amply the promises of the earlier editions. One of the chief advantages of Stewart's method is his purely clinical approach. By this means he does

away with the perplexing questions of a theoretical nature which so frequently obscure the problems presented in the diagnosis of nervous diseases. There are few books in English which give one greater pleasure in using than this. The make-up of the book is very satisfactory, the print is clear and the illustrations are apt and illuminating. This last edition is sure to be the same constant source of aid to the worker in nervous diseases as the other two, and its perusal will give the same kind of satisfaction that rendered the earlier editions pleasing.

FOURTH REPORT OF THE WELLCOME TROPICAL RESEARCH LABORATORIES AT THE GORDON MEMORIAL COLLEGE, KHARTOUM. Volume B.—General Science. By Andrew Balfour, M. D., B. Sc., F. R. C. P. Edin., D. P. H. Camb., Director. Fellow of the Royal Institute of Public Health, the Society of Tropical Medicine and Hygiene, and the Incorporated Society of Medical Officers of Health; Member of the Association of Economic Biologists; Corresponding Member Société de Pathologie Exotique and American Society of Tropical Medicine; Medical Officer of Health, Khartoum; etc. Published for Department of Education, Sudan Government Khartoum. New York: Toga Publishing Co. 1911.

A serious trouble confronts the reviewer of this book. He does not know which portion to commend the highest. The knowledge of the remarkable scientific advances being made in the heart of Africa is almost startling; the discussion of the condition of the native in relation to medicine and morals is most instructive; the illustrations are works of art; and the book-making is unusually good. Therefore, whether it be from the critical standpoint of art, science, or literature, the book is a masterpiece.

DISEASES OF THE DIGESTIVE CANAL (Oesophagus, Stomach, Intestines). By Dr. Paul Cohnheim, Specialist in Diseases of the Stomach and Intestines in Berlin. From the Second German Edition. Edited and Translated by Dudley Fulton, M. D., Assistant Professor of Principles and Practice of Medicine, University of California College of Medicine, Los Angeles Department; Attending Physician, Los Angeles County Hospital. Illustrated. Second Edition. Philadelphia and London: J. B. Lippincott Co. Price, $4.00.

The second English edition of this work, like its predecessor, adheres to the plan of a purely practical textbook, dealing with methods and theories which clinical experience has shown to be of working value. Among the additions to this edition by the translator may be mentioned recent improvements in methods of diagnosing lesions of the esophagus, a section on chronic cardiospasm, a discussion of acute dilatation of the stomach, and the technique of sigmoidoscopy. The recent work in x-ray diagnosis has received full notice.

AN INTRODUCTION TO EXPERIMENTAL PSYCHOLOGY. By Charles S. Myers, M. D., Sc. D., Lecturer in Experimental Psychology in the University of Cambridge. Cambridge: At the University Press (G. P. Putnam's Sons, New York). 1912. Price, $0.40.

There have been numerous attempts to write books on psychology in a few pages. One approaches each such attempt with a feeling close to scepticism. Within the limits of a small book such as this there is little room for a presentation of the doubtful elements of psychology. What is set down must be set down as though it were absolutely true. With this limitation in view, and with the idea that the author is simply trying to tell some of the facts of experimental psychology, this book can be read with pleasure and profit. It is the sort of thing which one would have ready at hand as a preliminary reading to the larger treatises on psychology. As such, no doubt, the author has planned it. If this is the case, then the book must be said to be successful and to present to the reader just what the author has intended; that is, a true introductory description on some of the data of experimental psychology.

STUDIES IN PSYCHIATRY. Vol. 1. By Members of the New York Psychiatrical Society. New York: The Journal of Nervous and Mental Disease Publishing Company. 1912.

In No. 9 of the series of Nervous and Mental Diseases there is contained various papers by members of the New York Psychiatrical Society, most of

them by men whose names carry with them a certain degree of authority and scholarship—Dana, Bailey, Adolf Myer, Jeliffe and others are contributors to this volume. It is entirely impossible to select from these papers those of special significance. They are selected with the greatest of care and serve to illustrate the activities of the New York Society in a very practical way. We have long in this country been without such collections in psychiatry, and the appearance of this volume seems to indicate that American psychiatry is rapidly reaching the place that it should occupy, comparable to the position of that branch of medicine on the Continent.

It is to be hoped that each year a similar volume will appear.

A Handbook of the Diseases of the Eye and Their Treatment. By Sir Henry R. Swanzy, A. M., M. D., D. Sc., Past-President of the Royal College of Surgeons in Ireland, Past-President and Bowman Lecturer of the Ophthalmological Society of the United States, Surgeon to the Royal Victoria Eye and Ear Hospital, and Ophthalmic Surgeon to the Adelaide Hospital, Dublin, and Louis Werner, M. B., F. R. C. S. I., Sen. Mod. Univ. Dub., Ophthalmic Surgeon to the Mater Hospital, Assistant Surgeon to the Royal Victoria Eye and Ear Hospital, Professor of Ophthalmology, University College, Dublin. Tenth Edition. With Illustrations. Philadelphia: P. Blakiston's Son and Company. 1912. Price, $4.00.

In this excellent book of 615 pages, Swanzy and Werner have prepared a remarkably complete and satisfying manual on diseases of the eye. The present tenth edition contains about the same amount of text as the ninth edition; but, in consequence of an alteration in the shape of the book, the pages are fewer. The chapters have been rearranged, the earlier ones now treating of the normal eye and its functions, and the methods of examination. The entire work has been revised and much obsolete matter discarded. Twenty-one colored figures of external diseases and ophthalmoscopic appearances, prepared by Dr. Werner, are now for the first time presented.

Spondylotherapy. Physio-Therapy of the Spine Based on a Study of Clinical Physiology. By Albert Abrams, A. M., M. D., University of Heidelberg, F. R. C. S. Consulting Physician to the Mount Zion and French Hospitals, San Francisco; Formerly Professor of Pathology and Director of the Medical Clinic, Cooper Medical College (Department of Medicine. Leland Stanford Junior University), San Francisco. Third Edition, Enlarged San Francisco: The Philopolis Press. 1912.

This volume contains a most startlingly radical position regarding the treatment of disease. As its name implies, it is a system of therapy based upon the influence of the spinal nerves upon the organism. Almost all diseases of the nervous system and of the bony architecture and viscera are covered. In many of the ideas expressed, Dr. Abrams stands alone. The work has passed to its third edition, is much enlarged and is replete with interesting observations and illustrations.

Retinoscopy (or Shadow Test) in the Determination of Refraction at One Meter Distance, With the Plane Mirror. By James Thorington, A. M., M. D., Professor of Diseases of the Eye in the Philadelphia Polyclinic and College for Graduates in Medicine; etc. etc. Sixth Edition, Revised and Enlarged. Sixty-one Illustrations, ten of which are colored. Philadelphia: P. Blakiston's Son and Company. 1911. Price, $1.00.

This little book which has become the standard short treatise on retinoscopy now appears in the sixth edition. All the changes are for the best and bring the book thoroughly up to date.

Exploration Manuelle de L'Estomac et en Particulier sa Palpation Directe et Profonde. By L. Pron. Librairie Médicale et Scientifique. Paris: Jules Rousset, Editeur, 1, Rue Casimir-Delavigne. 1912. Price, 2 fr. 50.

A number of interesting methods of gastric palpation are discussed in this monograph, most of which have to do with the determination of the site of the greater curvature of the stomach. Among them are the pain-signal (Douleur-Signal) based upon the observation that the pain, due to pressure over the solar plexus, diminishes or disappears when the palpating hand reaches the lower border of the stomach; the interpretation of gastric splashing elicited

under various circumstances; deep palpation of the stomach, by means of which the empty stomach may be felt on inspiration to come down against the hand pressing down firmly a little below the greater curvature. The determination of the presence or absence of various gastric lesions by means of these manipulations occupies the bulk of the volume, the perusal of which may be recommended to anyone interested in these matters.

MODERN METHODS IN NURSING. By Georgiana J. Sanders, Formerly Assistant Matron at Addenbrookes' Hospital, Cambridge, England; Formerly Superintendent of Nurses at the Polyclinic Hospital, Philadelphia, and at the Massachusetts General Hospital, Boston. With 228 Illustrations. Philadelphia and London: W. B. Saunders Company. 1912. Price, $2.50.

This is much more than a textbook of nursing. Fully half of it is devoted to an account of the various diagnostic and surgical methods that the nurse will see the physician, under whom she is serving, use, but which she will not have occasion to use herself. It is, of course, well for the nurse to have some knowledge of the significance of these procedures, even though it may not be wise to insist that she burden her memory with the detailed knowledge of them. The book will serve thus as a useful volume of reference for the nurse rather than as an actual textbook while she is in training.

DAS ROENTGENVERFAHREN IN DER CHIRURGIE. Mit 55 Figuren auf 4 Tafeln und 17 Figuren im Text. Von Dr. Alban Koehler, Spezialarzt fuer Roentgenologie in Wiesbaden. Berlin: Verlag von Hermann Meusser. 1911.

This small volume of seventy-eight pages is a classical review of the legitimate field of x-ray diagnosis and therapy. The author, Dr. Alban Koehler, was honored last year with the presidency of the German Roentgen Society. This small volume is worthy of being translated into English and placed at the disposal of the American surgeon and physician to whom it would serve as a splendid guide. The book is beautifully illustrated by actual photographic reproductions of x-ray negatives. We would recommend this small volume to every radiologist as an example of classical radiological description. We would recommend it to every physician and surgeon for its conservative estimate of x-ray values

DIE ZUCKERKRANKHEIT (Diabetes) ihre Ursachen. Wesen und Bekaempfung. Gemeinverstaendlich dargestellt von Dr. med. A. Sopp. Spezialarzt fuer Magen-, Darm- und Zuckerkranke zu Frankfurt am Main. Wuerzburg: Verlag von Curt Kabitzsch. 1912. Price, 1.50 m.

In no disease is a successful therapy so dependent upon the patient's intelligent co-operation as in diabetes. A booklet, which presents the subject clearly to the layman and which the physician can safely place in his patient's hands, thus fills a distinct need. Dr. Sopp's little book is written with restraint and yet with the necessary degree of fullness, and will be found useful, not only by the patient, but often by the physician himself. It deserves to be translated.

HEREDITY IN THE LIGHT OF RECENT RESEARCH. By L. Doncaster. M. A., Fellow of King's College. Cambridge: At the University Press (G. P. Putnam's Sons, New York). 1911. Price, $0.40.

In this little volume of some 130 pages is contained a very clear exposition of the present data on heredity, written in a clear way, with illustrations selected chiefly for the purpose of making clear what is contained in the text. There is no bibliography, and comparatively little discussion. There is, perhaps, at the present time no subject which is of more interest than heredity, and there is no little book which the reviewer is aware of which places the subject so clearly and easily before the reader.

HOME HYGIENE AND PREVENTION OF DISEASE. By Norman E. Dittman, M. D. New York: Duffield and Company. 1912.

The success of popular booklets on first aid to the injured have led the writer to the production of this volume on first aid to the sick. It is arranged, like an encyclopedia, in alaphabetical order by diseases or organs, and under each heading gives such information regarding treatment or prevention of illness as seems suitable for the layman. The danger of such a book is that it tends to lead to self-medication; it will be chiefly valuable in more or less isolated homes where the services of a physician are not readily obtainable.

THE INTERNATIONAL MEDICAL ANNUAL. A Year Book of Treatment and Practitioner's Index. Contributors: Sir Chas. Bent Ball, M. D., F. R. C. S. I.; Victor Bonney, M. S., M. D., F. R. C. S.; Francis D. Boyd, C. M. G., M. D., F. R. C. P.; Francis J. Charteris, M. D., B. Ch.; Carey F. Coombs, M. D., M. R. C. P.; John B. Deaver, M. D., Philadelphia; Prof. Dr. Anton Elschnig, Prague; Percy Fridenberg, M. D., New York; H. Wippell Gadd, F. C. S.; Edward W. Goodall, M. D., B. S.; Oskar C. Gruner, M. D., Lond., Montreal; W. Sampson Handley, M. S., M. D., F. R. C. S.; Charles Thurstan Holland, M. R. C. S., L. R. C. P.; Robert Hutchison, M. D., F. R. C. P.; Robert Jones, F. R. C. S.; Norah Kemp, M. B., C. M.; Prof. Dr. Stéphane Leduc, Nantes; Priestley Leech, M. D., F. R. C S.; Charles A. Leedham-Green, M. D., F. R. C. S.; E. G. Graham Little, M. D., F. R. C. P.; Charles Fred. Marshall, M. D., F. R. C. S.; Keith W. Monsarrat, M. B., C. M., F. R. C. S.; Jos. J. Perkins, M. A., M. B., F. R. C. P.; D. B. Pfeiffer, A. B., M. D., Philadelphia, etc. etc. Thirtieth Year. New York: E. B. Treat and Co. 1912. Price, $3.50.

The present volume of the "International Medical Annual" is on a par with the previous issues of this excellent summary of medical matters of importance, and there is no mistaking that its able contributors practised patience and excellent judgment in collecting data. Each subject receives the attention it should to bring out the important features which have been discussed in the medical journals during the past year or two; hence the general practitioner may with the very least trouble keep himself *au fait* with many points which may have escaped his notice in the limited number of journals which he read. But not only will he find a well-arranged résumé of the various subjects, but a number of original articles which, on account of their authoritative tone and conciseness of statement, cannot fail to interest and benefit him much more than would a number of long-winded articles for which he has neither the time nor inclination. To illustrate how "up-to-date" this volume is, mention of two articles should suffice: "Ionic Medication" by Stéphane Leduc, and "Radio-Activity in Diagnosis and Treatment," by Charles Thurstan Holland.

DISEASES OF THE STOMACH. A Text-Book for Practitioners and Students. By Max Einhorn, M. D., Professor of Clinical Medicine at the New York Post-Graduate Medical School and Hospital; Visiting Physician to the German Hospital. Fifth Revised Edition. New York: William Wood & Co. 1911. Price, $3.50.

The profession will welcome a new edition of this popular work. Like the previous editions this one bears the strong stamp of the author's individuality. Considerable attention is given to the *x*-ray examination of the gastro-intestinal tract and many skiagraphs are reproduced. The author's duodenal pumps for obtaining duodenal contents and for feeding patients with gastric ulcer, and his "thread impregnation test" for the diagnosis of ulcer, are among the new features of the work.

A SURGICAL TREATMENT OF LOCOMOTOR ATAXIA. By L. N. Denslow, M. D., Fellow New York Academy of Medicine; Late Physician, Diseases of the Skin (Out-Patients), Bellevue Hospital, New York; Late Professor, Genito-Urinary Surgery and Venereal Diseases, St. Paul Medical College, Minnesota. London: Bailliere, Tindall and Cox. 1912. Price, 3 s. 6 d.

This volume contains the theories of Denslow regarding the treatment of locomotor ataxia. This collection of theories appeared several years ago in one of the principal surgical journals and was sufficiently discussed at that time. The book is of interest in that it contains a statement of a set of views regarding this nervous affection, which have not been substantiated by any observer except the author.

A MANUAL OF FEVERS. By Claude Buchanan Ker, M. D. (Ed.), F. R. C. P. (Ed.), Medical Superintendent, City Hospital, Edinburgh, and Lecturer on Infectious Diseases to the University of Edinburgh, Author of "Infectious Diseases: A Practical Text-Book." New York: Oxford University Press. 1911. Price, $2.50.

This manual deals with the infectious fevers and is intended especially for the use of students. The author limits himself to a consideration of the infectious diseases common in Great Britain; thus no mention is made of such diseases as dengue or yellow fever. The subjects are treated mainly from the clinical viewpoint. A number of temperature charts and some excellent photographs of skin eruptions add value to the work.

EDITORIAL.

THAT WONDERFUL ORGAN—THE AMERICAN STOMACH.

According to Porphyry, when an Egyptian of importance was embalmed his countrymen "take out the stomach and put it into a coffer, and, holding the coffer to the sun, protest, one of the embalmers making a speech on behalf of the dead. This speech, which Euphantos translated from the native tongue, is as follows: 'O Lord of the Sun, and ye gods who give life to man, receive me and make me a companion of the eternal gods. For the gods, whom my parents made known to me, as long as I have lived in this world I have continued to reverence, and those who gave birth to my body I have ever honored. And as for other men, I have neither slain any, nor defrauded any of anything entrusted to me, nor committed any other wicked act; but if by chance I have committed any sin in my life, by either eating or drinking what was forbidden, not of myself did I sin, but owing to these members'—at the same time showing the coffer in which the stomach was. And having said this, he throws it into the river, and embalms the rest of the body as being pure."

Thus the Egyptians; and though we cannot but admire their common sense in humiliating an organ that was not intolerant of those vast mysteries of the Egyptian kitchen of an older day, to visit the same ignominy on the American stomach would indeed be a wanton disrespect to a member of our highly civilized bodies that has stood us in good stead, even under the strain of culinary deluges such as have often moved both native and foreign critics to songs of dispraise. At least, this was our opinion until a few weeks ago; but according to such authorities in medical journalism as the *Boston Medical and Surgical Journal* and the *New York Medical Journal*,—the former in its laudations of the Dairy

Lunch and the latter in its paean of American pie,—our stomachs have not been the triumphant heroes we had thought them, since the writers of the editorials show incontrovertibly how blessed indeed the American people are to have constantly with them two such culinary masterpieces, when the national digestion might have been subverted by some fanciful dish introduced into this country by the early French and Spanish explorers.

The subject of what we ought to eat and what we ought to avoid, how we should masticate and how not, the foods to be shunned in summer and those to be courted, the daily amount of protein according to Voit and Chittenden that is necessary to health, the sort of breakfast which should be eaten and the sort which should invite our murderous glances, are not peculiarly American topics of medical exploitation; but, as so often happens with us when once a matter of reform, be it medical, literary, or social catches our fancy, the phalanx marshalled for or against its widespread acceptance is of formidable proportions. And out of the welter of theories and fancies, of whimsies and crotchets, of frenetic enthusiasms and fierce denunciation, of diet syntheses built to save a nation only to be analyzed and forthwith to be demolished—again to save a nation, what superlatively gifted individual, though an excellent swimmer through eddies that would swamp a lesser man, could possibly arrive at a reasonable conclusion unless his common sense shakes him back into the state of sanity which, we take it, was his before his plunge. This statement is made not for the sake of a gewgaw of speech, but because of our muddled intelligence on account of having recently read two books on diet—"What to Eat and Why" by G. Carroll Smith,* a book conceived by an apparently normal man, and "Les trois aliments meurtriers" (The Three Murderous Aliments) by Paul Carton,** in which a food fanatic slays without mercy—alcohol, meat and sugar!

If we are not mistaken it was Pawlow, who said that digestion and assimilation of different kinds of food depend upon the appetite, which is psychical. And bearing this in mind are not variety and a gustatory manner of preparing food virtues which cannot be overestimated? Is the Dairy Lunch an expression of the sort of variety that invites aught but bolting, and is pie, especially when cold, gustatory? And what must not be the peculiarities of a psyche that can arouse itself from dormancy vis-à-vis the culinary attractions just mentioned, and pass at once into the purest ether of exaltation accompanied by a salivary and gastric flow!

But to revert to the heroism of the American stomach, an attitude which we persist in despite the recent "canonization" of the aforemen-

tioned food-stuffs, our stubborn front is quite well supported by Ali-Bab (Henri Babinski, brother to the great neurologist) in his chapter on American cooking* as judged by his foreign eyes and foreign stomach when brought into juxtaposition with its elemental, and, which is the same, national features. To quote: "I have seen in Wall Street, at the hour when speculation is rife, millionaires lunch off a slice of corned beef and pickles. And they commanded my pity! I have seen, in the American restaurants in the West, the following spectacle: a patron arrives and seats himself; a waiter approaches and reads a long litany comprising the names of the tempting dishes, and which by the way are almost identical from day to day—roast beef, boiled beef, corned beef— and these delicacies—corn, iced cream, and cheese. The gourmet (?), knowing beforehand the names of the dishes, scarcely listens to the recital, reads his paper, and continues silent. Thereupon the waiter brings the meat and a number of small dishes containing the vegetables for that day, and places them around the unobserving patron. The latter listlessly plunges his fork into the various articles, generally without looking at them, since the perusal of the paper continues, carries the food mechanically to his mouth, washes it down with gin, beer, whiskey and soda, always cold, and finishes the performance in five minutes!"

Now, even though we strip this of the bias of the usual foreign critic of American customs, is there not enough that is truthful in Henri Babinski's remarks to make us grateful to an organ that has all the patience and tolerance of Walt Whitman's lines:

"For we are bound where mariner has not yet dared to go,
And we will risk the ship, ourselves, and all"?

TYPHUS FEVER IN AMERICA.

Those who remember the history of typhoid fever will quickly recall the early difficulties in differentiating typhoid and typhus fever. After years of confusion, Gerhard, of Philadelphia, finally gave clear clinical pathological pictures of the two diseases, which stamped them as distinct entities. Since his time, however, the paratyphoid group has entered the field, and other obscure fevers have been met with which often have caused great difficulty in diagnosis. Every clinician has met with cases of fever resembling mild typhoid in many particulars, with negative blood findings or with other minor features which did not permit a diagnosis of frank typhoid to be made. Such cases have often been heaped to-

*Gastronomic pratique: Etudes culinaires. Paris: Ernest Flammarion. 1912.

gether, sometimes under group names of "febricula," "ephemeral fever," or what not; but never have they been classified on a sound etiological, pathological, or clinical basis.

With such a state of affairs it is of extreme interest to follow Brill's studies which resulted in grouping 221 of these cases together on a purely clinical basis. These cases, observed for fourteen years at the Mt. Sinai Hospital, New York, present a distinct clinical picture, the main features of which may be characterized as follows: Incubation period of four to five days; sudden onset with intense headache; high fever; a short course lasting from nine to sixteen days; a characteristic maculo-papular rash; leucocyte count averaging 11,000; sudden drop of temperature by crisis or rapid lysis, and complete recovery.

Bacteriological and serological studies on blood, urine, and feces were constantly negative, so that the disease could not belong to the typhoid group. In the first series reported all the cases recovered, so that pathological data are completely wanting. A subsequent report, however, gave the post-mortem findings of 2 fatal cases, and in these none of the characteristic lesions of typhoid fever were present. Brill considered that he had succeeded in grouping together a series of cases with a clinical picture definite enough to warrant calling the disease "an acute infectious disease of unknown origin."

The possible relationship between Brill's disease and typhus fever is discussed in the first communication. The clinical similarities suggested their identity, but the practically uniform absence of fatality and lack of contagiousness were not in harmony with Brill's conception of typhus. Before he woud be willing to consider them as identical it would have to be proved that typhus fever had been so changed that it could become a non-malignant, non-contagious disease.

Later there appeared a long report by Friedman, of New York, in which he attempted to show by analogy with typhus fever in Russia that Brill's disease, on clinical grounds alone, must be considered as typhus fever. He reviews what appears to have been a broad experience with typhus epidemics and endemics, and claims that cases identical with Brill's disease are common. The non-malignancy argument then is refuted; and as for the non-contagiousness of the disease, reference is made to the now well-known observations that typhus fever is a disease of filth and bad sanitation and that its mode of conveyance is through body and head lice. Neither filth nor lice are present in the wards of Mt. Sinai Hospital, which will account for the absence of infection among doctors and nurses attending the cases.

Undoubtedly the final solution of the nature of the disease is given

by the work of Anderson and Goldberger. Although Brill had been unable to transfer the disease to monkeys, Anderson and Goldberger were successful in their attempts; and, moreover, were able to carry the disease from one monkey to another. In a striking series of experiments they demonstrated the identity of Brill's disease and typhus fever by showing that monkeys which had recovered from an attack of Brill's disease were immune to Mexican typhus, and, vice versa, monkeys which had had Mexican typhus were immune to Brill's disease. These experiments, it seems to us, place Brill's disease beyond a doubt under typhus fever, and warrant calling it typhus fever.

The importance of all these observations is by no means limited to the field of interesting diagnoses. Typhus fever has existed in New York for years, and unpublished observations of Anderson* and Strouse** show that the disease is present also in Chicago. Although the mode of conveyance of the disease is now well known, and although it apparently has been so modified by its American environment as to be a comparatively benign affliction, it nevertheless is a reportable disease, and physicians as well as Boards of Health ought to be on guard against it. Remembering how a healthy typhoid or diphtheria bacillus-carrier can be a regular Nemesis in a community, it is only logical to suppose that the mild typhus now in this country may become a source of grave danger, and it is only conservative for the medical world to realize this possibility.

---

*Read at the meeting of the American Association of Pathologists and Bacteriologists in Philadelphia, April, 1912.
**Illinois Medical Society, Springfield, May, 1912.

OPINION AND CRITICISM.

RODIN BEFORE THE BAR OF MEDICINE AND LITERATURE.

Rodin, who to-day is the commanding figure in the world of sculpture, is being subjected, as all great men are directly they "arrive," to criticism, pleasant and otherwise. On the one hand, if we are to believe a sympathetic critic in the *Paris Médical* of September 30th, 1911, the greatest sculptor since Michael Angelo has taught medical men such invaluable lessons in anatomy that the word "arresting" barely expresses his message to medicine; while, on the other, Frederic Harrison, the Positivist philosopher and critic, in a recent number of the *Nineteenth Century and After,* asseverates, in his article "The Cult of the Foul," that "the most repulsive, unnatural, unmentionable act or sight, when represented with striking truth, becomes a work of art, and, according to Rodin, beautiful by its artistic power. This is an absurd sophism."

Now, whom are we to believe, to which critic pin our faith? Can the literary man with all his acumen see the anatomical beauties in a statue in the manner an adept in anatomy would, can he appreciate the plastic representation of the emaciated and the diseased with the keenness of a clinician? We doubt it; and just because of his limited knowledge of these he is apt to be the outraged ethical teacher and the purveyor of false notions. He is just according to his lights, but his lights are within a limited circle; and when he passes beyond the territory which is his by constant exploitation, he is very much at sea. Of course, if art is merely something "artistic," in the sense that it must be beautiful otherwise it fails in its mission, the moralist may be right; but the modern idea, and for that matter the dominating idea in all ages has been that the narration of incidents in oil or stone need not necessarily limit itself to what is beautiful. If life is many-sided, and art is to portray it with fidelity, then the inclusion of many things that do not enter into a bread-and-butter existence must be respected.

But this tempest in the tea-pot is really out of place in a medical journal, since the mission of physicians is not to ferret out the damage which our morals may sustain from looking at a statue that portrays a phase of life which is not "artistic," as instanced in "La Vieille Heaulmière" (The Old Strumpet), one of Rodin's masterpieces, but to be on the alert for knowledge that will awaken within them the desire to go deeper into their studies. Now, no one, who has made a careful study of anatomy, can fail to reap benefit from Rodin's "The Thinker," for there he will see something that perhaps escaped him while immersed

in his study, a something that will rise to importance by fastening in his memory what no repeated readings in his textbook, or careful and laborious work in the dissecting-room can teach him. He will see a representation of the musculature, that is so true to what really obtains in the human form, that whenever he wishes to recall to his hazy memory a half-forgotten muscle, the recollection of this Rodin piece of sculpture will not be without help in setting him right. And even the much-criticized statue of the "Old Strumpet" will carry to him an equally important message—the deterioration of muscle in disease.

LITERARY NOTES.

In her memoir of "Augustus Charles Bernays" (C. V. Mosby Company, St. Louis) Miss Thekla Bernays evinces an attitude toward her subject that might be emulated by all future biographers with profit. This attitude is warm with humanness, sympathy and a degree of forgivingness that bespeak not only a sympathetic appreciation of human foibles, but the broadly cultured spirit that should inhere in all biographers if they would enlist the interest of readers in pen-portraits that are not machine-made but alive with all the lights and shadows of existence. That Dr. Bernays was an outstanding figure in the medical profession of St. Louis is fully appreciated by those who knew his work as a surgeon; but what is not so well known, though many distorted accounts were given by his enemies during his lifetime, is the intimate life of the man—his charm of humanity, his culture derived from a love of literature, his audacity of thought and of action, his impatience of stupidity, his certainty of power that at times bordered closely on egotism, and his relation to his sister, the present biographer, a relation that breathes all those enviable qualities which belong to ardent friendships. When Dr. Bernays arrived in St. Louis in 1878, after completing his studies in Heidelberg, Berlin, and London, it was no easy matter on his part to adapt himself to the conservative spirit that reigned supreme in the medical circles of this growing city of the Middle West, and the first onslaught that young David made on Goliath was resented as a mortal insult. Nor was young David's first mistake ever forgotten; and even when he "arrived," as the French say, the old conservative spirit was just as rampant as in the beginning, and few if any of the strong-as-oak respectables would grant him his just dues. Of course, this feeling occasioned bitterness on both sides; but, now that these foolish wrangles are over, who can restrain a smile when thinking of the dire display of human foibles that are always with us? But, be it said here, the smile to-day, at least from the point of view of the writer of these lines, is at the expense of the conservative spirit, that stumbling-block in the path of all cosmopolites in provincial towns, and not at the expense of the subject of this memoir;

for despite his failings, perhaps increased by opposition and criticism, no one can gainsay his rank as a free-lance in the province of surgery, and an adept in anatomy and physiology. Brilliancy he had and audacity; and though medical men may talk until the crack of doom to the effect that these qualities are really a detriment to a medical man, and not an asset, since only too often they unseat judgment, to deny them their full worth is really a declaration of a stodgy intelligence that fears something above the ordinary. A gentle criticism might be tolerated, but a wholesale denunciation must surely indicate that the practice of medicine, as conceived by the rank and file, has not as yet achieved a standard on a par with those of all the other liberal professions, where, we take it, daring, boldness and intrepidity count for much.

———

In Dr. Maria Montessori's "The Montessori Method" (Frederick A. Stokes Company, New York) there is much food for thought; for, if we have read her book aright, our ideas as regards the education of the young have not only been wrong, but have arisen from an asininity of which the less said the better. Now, though we have for many years kept in mind that the child is father of the man, what have we really done, in an educational way, to make the child the sort of forerunner he should be to make his manhood worth while. Not only do we force the youthful mind into our way of thinking when so-called home education is practised upon him, but at school the public school teacher takes the mind in hard, knuckly hands, mauls it good and hard until it is broken into bits, and then pronounces him an excellent pupil when the facets fit in nicely with the many facets of the multitudinous segments of what is known as the public school curriculum. It is not a question of watching the youthful mind to note what its predilections are, what studies it acquires with greater ease, what studies are so difficult to acquire that a mental upset results, but strict obedience to a hard and fast rule from which deviation, on the part of the child, results in punishment and even in expulsion; in short, a diluvium of queer facts and fancies is poured into the mind *nolens volens*, and great pride we take in asserting that the triumph of the adult mind over the immature mind is complete. But is not this treatment of the young the nefarious manner of the dictator, who takes small account of what his subjects really desire or need so long as his ends are achieved? Truth to say, this interference in the mental workings of the young, who really know how to do things in their own way but are never allowed, who have a "natural" way of thinking out the problems we set before them, slower perhaps than ours but effective in the long run, is prosecuted by teachers and parents because of their impatience and because they are continually thinking of their own convenience. "To-day," says Dr. Montessori, "we hold the

pupils in school, restricted by those instruments so degrading to body and mind, the desk—and material prizes and punishments. Our aim in all this is to reduce them to the discipline of immobility and silence,—to lead them,—where? Far too often toward no definite end. Often the education of children consists in pouring into their intelligence the intellectual contents of school programmes. And often these programmes have been compiled in the official department of education, and their use is imposed by law upon the teacher and the child. Ah, before such dense and wilful disregard of the life which is growing within these children, we should hide our heads in shame and cover our guilty faces with our hands!"

An autobiography that has unusual features is Dr. Leonard Portal Mark's "Acromegaly: A Personal Experience" (Ballière, Tindall and Cox, London), since it takes up a disease that is not only rare, but of the greatest interest, and expresses a candor that makes the volume of much greater value as a human document than would be possible by amalgamating many articles written in a detached and impersonal manner. Dr. Mark traces his disease from the beginning, and notes with the care of a keen observer each and every symptom; but the reader is not to infer from this that the clinical picture has the droning qualities of the usual medical article. To compare this personal record with the stuff the dry-asdust medical paper is made of would be doing the author an injustice, since interwoven throughout the whole record is enough mention of his innermost feelings to raise it to unwonted heights in a medical sense, and convey so graphic a delineation to the reader's mind that the impress is not soon forgotten. Who can read Chapter XIII—"My Black Week" —and the following chapter—"Post Tenebras Lux"—without admiring one who, under the most untoward circumstances, can practise the sort of self-analysis that might be of help to others when face to face with an incurable ailment, and who are in need of stoicism to tide themselves over what at first appears as a depression that can be met only in one way. How Dr. Mark lived through the week that meant the realization of his disease, how he combated his black thoughts, and how out of gloom he has passed into light, are throbs that mark the excursions of the pendulum of life into the Slough of Despond. But aside from all this there are many other good points in this book; and, since we know so very little of this strange pathological manifestation, it would be advisable for every medical man to study the trenchant and poignant narration as written by Dr. Mark.

Considering the number of inconsequental books that the food faddists pour upon us from month to month, it is with some relief that we turn to Dr. W. T. Fernie's "Health to Date" (John Wright and Sons, Bristol),

for here is to be found much that is well worth reading provided the reader is content with chapters that are well written, are not too turgid with scientific data, and are graced here and there by apt quotations from the works of well-known literary men. This provision is made for the reason that it is always well to be forewarned, since no disappointment is so great as when the student wrapped up in science tackles a new book in the hope of finding additional scientific material and then cries out against the author for not telling him something new. But besides the student, who has just been described, there are many of us who prefer to be "entertained," and for them this book should be a very good source. Dr. Fernie, as he states in his preface, is no longer a young man, which fact he emphasizes by calling his volume his swan song; and, even though he had omitted mention of the ripeness of his years, it would not have taken the reader many moments to have guessed that no one but an observer of many years' standing and with readings in many directions could have compiled so interesting and charmingly unobtrusive a book. This is mentioned because we wish to impress upon the reader the fact that just because of an absence of stridence, of that peculiar note which we conveniently call "modern," but which alas! betrays nothing but a desire on the part of an author to pummel us into his way of thinking by screaming his theories through many pages, this book is the sort that acts as a balm to our over-wearied spirits and wafts us back to a state of sanity that wots not of vagaries, but is content to take its sustenance from kindly philosophy, charm of literary style, and the optimism that can only come after many reflections on what should be retained and what discarded of the many and varied theories in regard to the preservation of health.

ORIGINAL ARTICLES.

A REPORT ON THE PROCEDURE OF OMENTOPEXY IN CIRRHOSIS OF THE LIVER.

By H. Horace Grant, A. M., M. D., of Louisville.

In an endeavor to estimate the practical value of an operative procedure to correct imperfect function in organic disease, the conclusions of properly weighed experience far over-match even the most scientific and rational theories. Particularly is this the case when the same theory can be made to work both ways. Since there is nothing new to be offered upon the subject under consideration, save from the practical side, the writer has a few facts to present, some coupled with suggestions and criticisms both pro and con, and some merely unbiased statistics.

Cirrhosis of the liver is best studied practically, according to Senator, as portal and biliary, or atrophic and hypertrophic. In portal cirrhosis the infection is by way of the vein, and in the hypertrophic form the toxines come through the hepatic artery. Almost all advocates of the Talma or Morrison operation regard the chances for improvement far better in the atrophic form, and particularly in the alcoholic variety. Rolleston finds the average age of death from cirrhosis to be forty-seven and a half years, with an earlier tendency in the form due to alcoholism. The percentage of frequency is as five to two in favor of men. The abuse of alcohol is undoubtedly an active contributory cause of cirrhosis, as 60 per cent. of the cases reported by Owen were hard drinkers, but inasmuch as the specific action of the cause of cirrhosis is not inflammation of the portal terminals, but a fibrosis of the liver structure constricting the vessels, it is quite likely that all cirrhosis of the atrophic variety is a mixed toxemia, and the influence of alcohol is perhaps merely instrumental in inhibiting natural resistance. The histology indicates that the fibrosis is general throughout the liver, and that as it increases it gradually cripples every function of the gland; and though latency and compensation occur in some cases, apparently spontaneously, in most instances when the condition has advanced to actual dropsy, it progresses rapidly to a fatal termination. The changes in the liver structure besides the fibrosis, which is mechanical in its effects, are chiefly degeneration of the cells; and as this condition advances, not only does the danger increase with the obstruction, but the toxines, which degenerated cells

should eliminate or destroy, accumulate. A very important commentary on the Talma-Morrison operation is the suggestion of Rolleston, who declares that even when an anastomosis is made between the portal and systemic veins, so much of the blood carrying the products or digestion will be diverted from the liver that the undestroyed toxines in this digestive blood-current will pass uncorrected into the system. He declares that such a collateral circulation loads so much additional work on the kidneys, that uremia is a common complication. It would appear, however, upon deliberate speculation that this theory is overstrained, inasmuch as no anastomosis, however free, would be likely to divert any blood from the portal circulation that the liver would be prepared to receive, as only the overflow would be carried off in this way.

As a matter of practical surgery, in view of the uncertainty of our knowledge of the details of the functions of the liver, spleen and pancreas, as well as of the general metabolism in the digestive organs, these conflicting theories we could well afford to disregard, if reliable statistics of carefully followed cases should show a fair percentage of cures in the essentially fatal lesion of cirrhosis. It is well known that cirrhosis may exist for years without ascites, which Rolleston thinks is oftener a toxemia, the result of liver failure than of mechanical obstruction; and theoretically he believes that the improvement which takes place through the collateral circulation is due partly to the relief thus given to the engorged liver; that it may more satisfactorily destroy the toxines in the blood passing through it, in the first place, and, in the second place, that the increased arterial blood-supply through these adhesions would afford more nutrition to the liver, facilitate phagocytosis and encourage compensatory hypertrophy. This compensation undoubtedly would increase the period of latency and indicate in many instances a symptomatic cure. Undoubtedly the belief is well founded that relief to the contracted liver vessels, by diminishing the amount of blood-flow, is a welcome one, and chiefly responsible for the temporary cessation of ascites. Rolleston's statistics show that death usually follows the development of ascites in about two months; and if, as other statistics abundantly indicate, relief to a certain extent follows omentopexy in from 30 to 50 per cent. for at least a year or two, with from 12 to 15 per cent. of symptomatic cures, the ascites must be much oftener due to obstruction than to toxemia; and when it is due to toxemia the condition is beyond the pale of hope. It is clearly out of propriety to discuss the anatomy of visceral anastomosis, as it has been fully described many times; hence, reference only is appended. It is enough to say that as Floyd* and Sappey** have abundantly shown, the anastomosis between the portal circulation and the abdominal veins is easily made, so as to give mechanical relief to the liver and the spleen if indicated, and that this is also further supplemented

---

*Medical Record, July 4th, 1903.
**Quoted by Corzon Annals, p. 837, July, 1907.

by diverting the excess circulation into the newly formed adhesions about the liver, which serve to nourish the impoverished liver structures and establish a compensatory hypertrophy which helps to limit the toxemia and protract the period of latency into years of comfort.

All authorities, who have given any thought to this operation, have agreed that it must be done as early as possible before the patient is too exhausted to stand it; but for a far more important reason, before such structural changes have taken place in the liver as will render it incapable of performing even such limited functions as may be consistent with the prolongation of life. When degeneration of the liver-cells has progressed to such a degree as to allow the digestive toxines to accumulate in the blood beyond the power of the liver to correct, no good can possibly be done by diverting them again into the general system; and it is very probable that the occasional prompt death after the operation of omentopexy is due rather to the accumulation of these toxines than to any other effect of operative interference. The symptoms of cirrhosis, before the occurrence of ascites, become of great importance in the study of this condition, as the diagnosis in the preascitic stage offers the consideration of the operation of omentopexy a far wider influence. These symptoms are not in any degree characteristic, but may be so combined as to render the diagnosis quite positive. A history of chronic dyspepsia, with perhaps recurring attacks of hematemesis, or blood by the rectum, especially if complicated with jaundice, bloated countenance, harsh skin, and diarrhea and general debility in a young patient with alcoholic history, will often enable the careful diagnostician to satisfy himself that exploration is indicated. Undoubtedly it will require a bold surgeon to advise omentopexy in the preascitic state of suspected cirrhosis until further confirmation of the value of the operation in the presence of dropsy has been obtained; but there can really be but one danger of importance, viz., the loss of liver action on the part of the portal blood. What this danger is can only be estimated. When one reflects that latent cirrhosis is often consistent with comparatively good health and that with occurrence of ascites failure is usually rapid, it appears a safe procedure, whenever physical indications upon and in the liver after exploration indicate cirrhosis, at once to resort to measures to establish anastomosis. In the last thirty years we have seen an advance, from an almost hopeless prognosis in operations for carcinoma neglected until all other treatment has been tried, to a promise of radical cure in from 20 to 40 per cent. of early operated cases. May it not be that an early relief given to degenerating liver-cells may at least arrest the progress, or at worst, greatly prolong the period of latency in the now uniformly fatal cirrhosis?

With a view to getting some new practical points upon this subject, the writer has sent the following queries to about sixty prominent surgeons:—

1. How often have you employed the operation in any of its modifications?

2. Were you able to distinguish the variety of cirrhosis often enough to make any comparison?

3. Can you approximately give the stage of the disease often enough to make comparison valuable?

4. What was the percentage of mortality, if any?

5. What percentage of considerable improvement or temporary cure was obtained?

6. What approximately was the duration of the improvement or cure?

The writer has reports of 144 operations, most of which have not been previously reported. The statistics thus obtained he has tabulated with the name of the surgeon, so that due weight may be given. Almost all these surgeons are of repute, whose reliability cannot be questioned; and if the conclusions most logically drawn from these reports are even half as promising as they indicate, the most pessimistic of us must feel encouraged.

The writer briefly reports 3 cases of his own:—

Mr. S., æt. forty. Seen with Dr. Boggess. Previous history was the characteristic one of progressive cirrhosis, but the patient had been up and about his work until about a month before seen by the writer. He was then attacked with a profuse hemorrhage from the bowel and also vomited some blood. He was so exsanguinated that he fainted, and his exhaustion and feebleness, accompanied by diarrhea, kept him in bed for about three weeks. After this time ascites developed, and he was tapped three or four times before omentopexy was suggested. At the time of operation he was barely able to walk and was losing his strength daily. This was about ten weeks after the attack of hemorrhage from the bowel. The operation was the typical one of Morrison; a large amount of fluid escaped, the patient made a prompt recovery from the operation, no subsequent tapping was required, and now after nearly three years, he is apparently in good health.

Both the others were hospital cases: old alcoholics greatly depressed in general health with extensive ascites, who had been tapped many times. Both were toxemic, and one died on the sixteenth day from a rupture of the wound when he was apparently recovering; the other died from exhaustion on the twentieth day.

TABLE OF CASES.

Operator.	No. of Cases.	Died.	Cured.	Imp.	Not Imp.	Not Traced.
Crile.	3	0	0	0	3	—
Bevan.	4	0	0	1	3	—
Philadelphia Surgeon.	11	1	0	6	0	4
Ricketts.	6	0	0	6	—	—
Finney.	6	3	2	1	0	—
Morris.	8	1	1	2	0	4
Carstens.	3	0	0	3	0	0
Oliver.	2	0	0	2	0	—

Operator.	No. of Cases.	Died.	Cured.	Imp.	Not Imp.	Not Traced.
Ill.	8	1	0	0	7	—
Winslow.	1	0	0	1	—	—
Grant.	3	2	1	—	—	—
Coffee.	3	0	0	1	2	—
Deaver.	2	0	0	0	2	—
Ransohoff.	8	1	2	3	2	—
Ferguson.	5	0	0	5	—	—
Frank.	3	1	2	0	0	—
Dean.	5	0	1	2	2	—
Philadelphia Surgeon.	2	0	0	0	2	—
Mixter.	2	0	0	2	—	—
Moore.	6	0	0	6	—	—
Matas.	6	1	1	4	—	—
Danna.	3	2	1	—	—	—
Schackner.	2	2	—	—	—	—
Mayo.	12	0	1	7	—	—
Ford.	2	0	1	0	1	—
Horsley.	2	0	0	0	2	—
Sherrill.	1	0	0	1	—	—
Reed.	6	0	6	6	—	—
Bents.	3	0	0	2	1	—
Bonnifield.	4	2	0	0	2	—
Willy Meyer.	4	0	0	2	0	—
Richardson.	6	0	4	1	1	—
Hayd	2	—	—	—	2	—

This shows a total of 144 cases of which 17 or about 11 per cent. died of the operation; 17 or 11 per cent. are reported as cured; 64 or about 44 per cent. improved; 32 or 22 per cent. are not improved.

It will be noticed also that the remaining 14, or about 10 per cent., are not traced. It is at least fair to presume that the same percentage of cure and improvement prevailed in this 10 per cent. as in the other 90 per cent., and thus the results are even a little better than those shown upon the face. The meaning of the word "cure" here is doubtless symptomatic, as it is not at all to be considered that the structural alterations in the liver were ever regenerated. The comments indicate that in all the cures reported, the patients were well after a period of three years or more. Mayo writes, "The average of those who died was two years and one of them lived five years." Winslow reports as improved, one who lived a year and a half. Sherrill reports as improved, one who lived two years. Besides this it is evident that many of the improved were rescued from a dying condition and given a lease of life for a year or more.

All the cases of Carstens, Morris, Moore, Crile, Ricketts, Ransohoff, Hayd, Ferguson, Bonnifield, and Ill are specified as very late and all suffering with ascites. Among the replies Murphy writes that he has been disappointed in the operation, and now thinks it inapplicable save in the early stage in young alcoholics. Deaver expresses himself as disgusted. Baldy believes the operation wholly illogical. A number of other men of wide surgical experience, such as Ochsner, Cordier, Peter-

son, Bovee, and McElrie write they have had no experience practically, but are ready to apply the operation at a suitable opportunity. Parke writes that he has done several operations, but was unable to follow the cases and could give no data. The writer felt it useless to occupy time with a discussion of the literature of the subject, to which a good many references are subjoined. For many of these references he is indebted to the kindness of Dr. Merrill Ricketts.

From a study of these reports of the experience of some thirty-five careful surgeons, it seems fair to conclude:—

(1) That even in the condition of advanced liver degeneration and general toxemia, with resulting ascites, over 10 per cent. of symptomatic cures are obtained, and over 50 per cent. at least are improved, comforted, and helped to months and years of life.

(2) That as this advanced condition is often preceded by a year or more of latency during which suspicious symptoms often declare the cause, early diagnosis of a lesion, which would surely lead only to the grave, justifies exploration and repair, with a far better promise than can be hoped for later on.

(3) That as it is not possible to be certain of the character of the cirrhotic lesion before exploration, the surgeon need not be deterred from the steps by an uncertainty as to its applicability, as all forms of cirrhosis are fatal under the expectant treatment.

The conclusions of Park, stated in his "Modern Surgery," seem to fit the indications fully. He says in substance, "If the indications produced by cirrhosis are met by a reasonably early omental fixation, there would seem to be a well-marked place for the procedure, and that inasmuch as these results can be no worse than the treatment by the expectant plan, with repeated punctures, the operation must be done, if at all, while the patient still has the strength and resistance to bear it." As to the technique, but few expressions were given. Matas prefers Narath's operation, which consists* of making an incision below the ensiform cartilage, drawing up the omentum and stitching it in a pocket between the peritoneum and the skin, in the subcutaneous tissue, and closing the wound so as to prevent hernia. The operation should be done under cocaine, as general anesthesia is very trying to patients in the extreme condition of ascites.

Mayo operates over the liver region on the right side as the first step, and taps later as may become necessary, and if the patient improves and it seems required, he makes a second operation on the left side.

The writer found, on looking over the statistics, that in some modification or other the operation has been done in this country and Europe several thousand times, and a few times in the preascitic stage. It seems wise to consider a different operation for the two stages—in the advanced cases, such as have heretofore been almost the only ones brought

*Medical Record, November 16th, 1904.

to operation, the steps suggested by Narath, under cocaine, seem the proper ones. If this is done in time, the originator believes that the enlarged and dilated abdominal veins will be seen within a week's time, and very promptly a compensatory anastomosis will be established, which will relieve the overtaxed liver and insure a latency long enough protracted to induce a symptomatic cure in a considerable number of cases. If, however, the operation is done in the preascitic stage, one must bear in mind that it is a preservation of liver function (perhaps that of the spleen also) that the surgeon has in view, and that it is desirable to provide a vascular scaffold about this organ which will furnish nutrition, since that within is impoverished. Hence, a more careful exploration of the viscera is necessary, and the organs should be carefully examined by the eye as well as the hand. A free incision is made in the midline; enlarged transversely, as advised by Schiazzi, if necessary, and after the surgeon has satisfied himself of the condition, he should irritate the peritoneal surfaces of the liver and spleen and the abdominal wall, by rubbing lightly with gauze, and then bring the doubled-up apron of omentum well up between these surfaces and tack with catgut sutures in this situation. This will place the new adhesions well away from any danger of interfering with the intestinal circulation, and will induce a free anastomosis, as well as provide for a compensatory hyperplasia about the liver and spleen.

CLINICAL INDICATIONS FOR MAJOR OPERATIONS ON THE TEMPORAL BONE AND THEIR PATHOLOGICAL INTERPRETATION.*

By Eugene T. Senseney, M. D., and Louis K. Guggenheim, M. D., of St. Louis.

PART II.

PATHOLOGICAL INTERPRETATION.

By Louis K. Guggenheim, M. D.

It will be our purpose here to interpret, in as clear and concise a manner as possible, the indications mentioned in Part I, of this paper. This we shall accomplish chiefly by the demonstration of pathological specimens. This paper, having been prepared less for the specialist than for the remainder of the profession, no attempt will be made to describe in detail any of the following microphotographs. We will strive rather to give a general impression of the pathological conditions in the temporal bone, which give rise to the aforementioned indications.

Anatomic Material.

The illustrations are mostly microphotographs of specimens made by the author in Berlin and Vienna. The material was embedded in celloidin and sectioned serially. The specimens were stained partly with hematoxylin-eosin and partly with Van Gieson's picric acid fuchsin.

Description of Normal Specimens.

In order to make the pathological specimens more easily comprehensible, the liberty is taken of first refreshing the memory of the reader with a few views of the normal ear.

Fig. 1.—The first illustration presented gives two views of the normal adult temporal bone. The one on the right is a lateral view; the one on the left shows the temporal bone from above. (1) Squamous portion; (2) mastoid process; (3) os tympanicum; (4) pyramid or petrous portion; (5) posterior cranial fossa. (Note the intimate relation existing between the pyramid on the one hand and the posterior and middle cranial fossæ on the other.)

Fig. 2.—Transverse section through the cartilaginous portion of the

external auditory canal. (1) Cartilage; (2) lumen of the canal; (3) hair follicle; (4) ceruminal glands; (5) sebaceous glands.

Fig. 3.—Normal temporal bone of an infant. (1) Squama; (2) annulus tympanicus; (3) pyramid; (4) promontory. Above 4 is the oval window; below, the entrance to the round window.

Fig. 4.—Frontal section through tympanic membrane and malleus. (1) Head of malleus; (2) handle; (3) short process; (4) Prussack's space; (5) tympanic membrane.

Fig. 5.—The ossicles. (1) Malleus; (2) incus; (3) stapes; (4) view from the median side of the drum membrane showing the articulation between malleus and incus; (5) view of the external surface of the tympanic membrane showing short process and handle of hammer shining through.
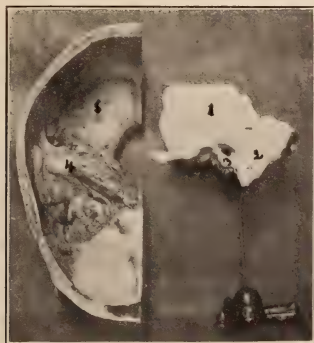
Fig. 1.

Fig. 6.—Articulation between malleus and incus. (1) Head of hammer; (2) body of incus; (3) strip of elastic cartilage; (4) capsule of the joint.

Fig. 7.—Transverse section through the cartilaginous portion of the eustachian tube. (1) Cartilage; (2) lumen of the tube; (3) membranous portion.

Fig. 8.—Membranous labyrinth of the right side. (1) Basal turn of the cochlea; (2) round window; (3) anterior vertical semicircular canal; (4) horizontal canal; (5) posterior vertical canal; (6) utriculus; (7) sacculus.

Fig. 9.—Section from the ampullary end of a semicircular canal. (1) Crista ampullaris; (2) cavity of osseous ampulla; (3) supporting connective-tissue; (4) fibres of the nervus utriculo-ampullaris; (5) neuro-epithelium covering crista; (6) cupola; (7) homogeneous mass

holding hairs of cupola together; (8) cross section of the nervus utriculo-ampullaris; (9) cavity of the membranous ampulla.

OTITIS MEDIA SUPPURATIVA ACUTA.

The first pathological condition to be considered is acute suppuration of the middle ear. In this disease, so common in childhood, the purulent process is primarily confined to the mucous-membrane lining of the middle ear. By middle ear the writer means not only the tympanic cavity, but also the entire mastoid process. This will doubtless astonish many who have heretofore believed that pus is present in the mastoid process only when there exists a mastoiditis. As a result of numerous post-mortem findings, many authorities have come to the conclusion that in practically all cases of acute suppuration of the middle ear there is pus present in the mastoid process. As long as there is free drainage through the external auditory canal, we
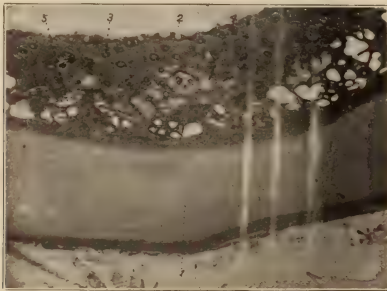
Fig. 2.

usually have no symptoms of mastoid involvement. As soon as retention of pus in the mastoid continues even for a short period of time, symptoms of a mastoiditis make their appearance. Further retention soon leads to an involvement of the thin bony walls of the mastoid cells, and finally, if not treated surgically, there occurs a spontaneous rupture with resulting subperiosteal abscess. Still further neglect results in a break through the periosteum and skin, with either ultimate recovery or permanent fistula formation. In Bezold's abscess the rupture is on the median side and inferiorly. It goes without saying that recovery may also occur without even an involvement of the bony walls of the mastoid cells in cases where nature or paracentesis relieves the retention in time. The retention of pus is due to an enormous swelling of the normally paper-thin mucosa lining the mastoid cells, the communications between the cells being in this way closed. To return to the tympanic condition, the

mucosa during an acute suppuration is very greatly swollen. This condition is due to hyperemia and cellular infiltration. Throughout are seen numerous small cysts. Their presence, first mentioned by Ruttin, has never been satisfactorily explained. They are not mucous retention cysts, as there are practically no mucous glands in the tympanic mucosa except around the tubal orifice. In all probability they are enlarged lymph spaces. In the medullary spaces of the bone, nearest the tympanic cavity, is usually noticed hyperemia with round-cell infiltration. Following the hyperemia and infiltration of the mucosa there occurs an exudation into the tympanic cavity and mastoid cells. The epithelium is in part destroyed. The drum membrane is, of course, involved in the process, and, after being bulged outward for a varying length of time by the ever-increasing exudate, is finally ruptured spontaneously unless paracentesis is performed. The perforation is usually quite small. In cer-

Fig. 3.

Fig. 4.

tain conditions, however, for example when the middle-ear suppuration complicates scarlet fever, there sometimes occurs an extensive destruction of drum tissue.

Complications of Otitis Media Suppurativa Acuta.

As complications of an acute suppuration of the middle ear may be mentioned acute mastoiditis, extradural abscess, sinus thrombosis, perisinus abscess, labyrinthitis serosa and, very much more rarely, suppurative labyrinthitis, brain abscess, and meningitis.

The middle-ear condition itself requires surgically nothing more than paracentesis. For acute mastoiditis, the simple mastoid operation should be employed, care being taken to establish a free opening into the mastoid antrum. For extradural abscess, the simple mastoid should first be performed, then the dura exposed to permit of free drainage. For sinus

thrombosis the simple mastoid operation, followed by the removal of sufficient bone to expose the lateral sinus as far posteriorly as the thrombosis extends and as far downward as is necessary, and the opening of the sinus, is indicated. Concerning ligation of the jugular there is a great diversity of opinion. Personally, the writer prefers, in most instances, to ligate both jugular and facial veins. As to the treatment of the thrombus after the sinus has been opened, he is decidedly opposed to removing same. He believes that practically nothing is gained by removing the thrombus, and very much harm may be done. For example, if the median wall of the sinus is involved, and the thrombus is more or less adherent, the removal even of a portion may open a new

Fig. 5.
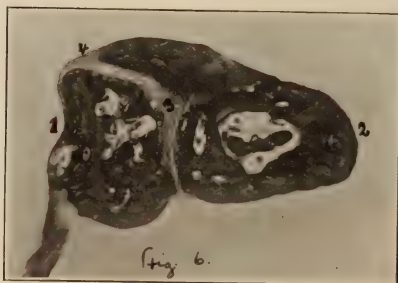
Fig. 6.

avenue of infection to the brain and its covering. Labyrinthitis serosa requires no operation. The surgical treatment of diffuse suppurative labyrinthitis consists in performing the labyrinth operation. The choice of operation for brain abscess depends upon the situation of the abscess; whether in the temporal lobe or cerebellum, and, if in the latter, the exact position is especially of importance. The procedures indicated in this condition have been fully considered in Part I. of this paper. It may be well to repeat that it is of the utmost importance that a brain abscess of otitic origin be opened through the region of the mastoid, as we are in this way able to deal first with the cause and afterwards with the result of the infection and its extension. The abscess may be opened away from the

temporal bone and the cavity drained, but by so doing we fail to deal with the primary focus of the disease.

Fig. 10.—Otitis media suppurativa acuta. Transverse section through the middle and internal ear of a child's temporal bone. The part of the tympanic cavity seen is the region of the round window. To the median side of this area is the ampulla of the posterior vertical semicircular canal. The pathological changes can be seen to better advantage in the next illustration which is an enlargement of the round-window region heretofore mentioned. (1) Membrana tympani secondaria; (2) beginning of cochlea; (3) ampulla of posterior vertical canal; (4) crista ampullaris.
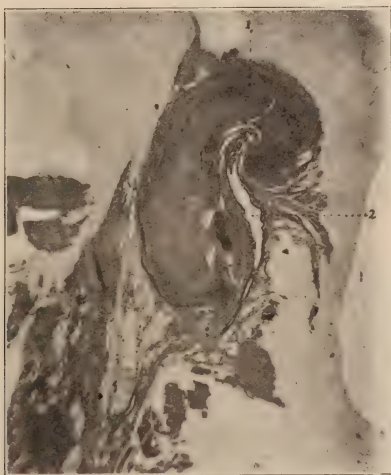
Fig. 7.

Fig. 11.—Otitis media suppurativa acuta. Region of round window. (1) Membrana tympani secondaria; (2) exudate in entrance to round window; (3) tympanic mucosa; (4) cysts; (5) medullary space in the bone near the tympanic cavity; (6) one of the cellulæ tympanici.

In this specimen the membrana tympani secondaria is seen to be somewhat swollen. The little canal leading to the fenestra rotundum is filled with a mass of exudate. Previous to the preparation of the specimen the entire middle ear was filled with a similar exudate. The mucosa which is normally quite thin is here enormously thickened. The swelling is due to hyperemia and round-cell infiltration. Throughout the mucosa

are seen numerous small cysts. The origin of these cysts has already been discussed. The medullary spaces in the bone nearest the cavity of the tympanum show hyperemia and round-cell infiltration. Here and there the epithelium has been destroyed, but, all in all it is fairly well preserved. In the upper right hand corner of the picture is one of the cellulæ tympanici. These small cells in the floor of the tympanum normally communicate freely with the remainder of the cavity. In this specimen the cell aforementioned is entirely cut off from the
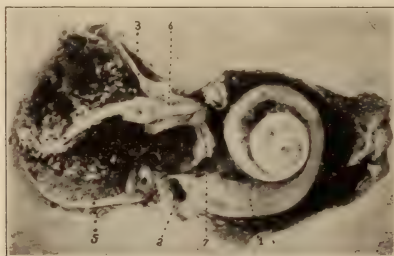
Fig. 8.
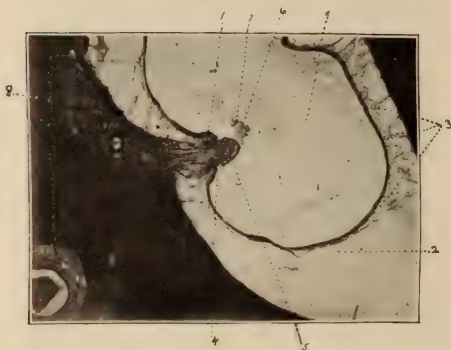
Fig. 9.

tympanic cavity by the enormously swollen mucosa. In just this way retention of pus in the mastoid process occurs.

Otitis Media Suppurativa Chronica.

The next condition to be considered is chronic suppuration of the middle ear. As concerns indications for operation we may divide all cases into two large groups, the first group being composed of those cases

which we cannot honestly treat conservatively—cases in which surgical interference is immediately indicated. The second group including simple chronic suppurations with central perforation, no cholesteatom formation and no bone involvement, we may with perfect safety treat conservatively for many months before advising operation. Now, pathologically the first group is naturally more interesting to us. In this group the condition of greatest danger and one which always gives an

Fig. 10.
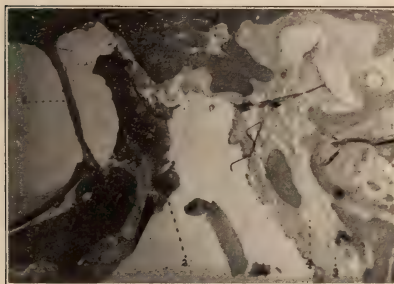
Fig. 11.

immediate indication for operation is the form of chronic middle-ear suppuration complicated by cholesteatom formation. What is this condition and why is it dangerous? First of all the condition should not be called cholesteatom, as true cholesteatom does not occur in the middle ear. Rather, we should speak of cholesteatomatous material or masses. These masses are composed of degenerated epidermis which has wandered into the tympanic cavity from the external auditory canal.

Nature is attempting to heal the suppurating cavity by epidermitization, just what we accomplish with the radical mastoid operation. All would be well if the epidermis growing in from the external canal had normal tissue to grow upon. The mucosa of the tympanum is constantly suppurating, and is therefore no suitable basis upon which the delicate epithelium may grow. The result is that as rapidly as epidermis grows in from the external canal it is thrown off into the tympanic cavity. Nature persists, however, in her attempt, with the result that the cavity is soon filled and pressure upon the bony walls is exerted. This
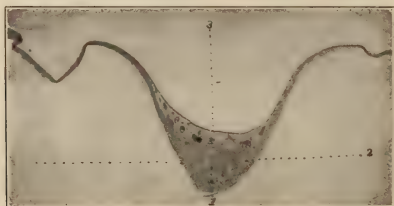
Fig. 12.

Fig. 13.

state of affairs leads to caries and extensive destruction in time. As a result of this tendency, all the dangerous intracranial complications may occur. Nothing can be gained by irrigation and other forms of conservative treatment. Large masses of cholesteatomatous material may be removed, only to be replaced in a short time by more. Operations through the external canal such as ossiculectomy with minor curettements, etc., are also entirely useless and not without danger. The only procedure indicated is the radical mastoid operation.

Fig. 12.—Transverse section through the tympanic membrane and

handle of hammer from a normal temporal bone. (1) Handle of hammer; (2) lamina propria; (3) epidermis; (4) mucosa.

The handle of the hammer, which is triangular in form, is seen to be completely surrounded by the middle layer of the drum, the lamina pro-

Fig. 14.
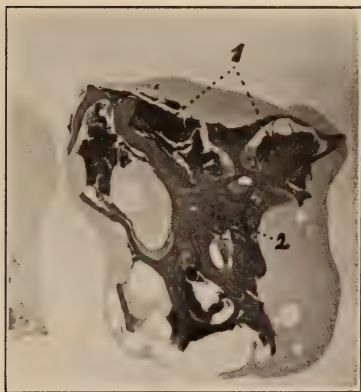
Fig. 15.

pria. Externally is the epidermis which is continuous with the skin lining the external auditory canal. To the median side is the thin mucosa which is continuous with the mucous-membrane lining of the tympanum. In the lamina propria are numerous blood-vessels and nerves.

Fig. 13.—Transverse section through the tympanic membrane and handle of hammer from a case of otitis media suppurativa chronica with cholesteatom formation. (1) Tympanic membrane; (2) handle of hammer; (3) perforation; (4) cholesteatomatous material.

The drum membrane is seen to be greatly thickened from a new connective-tissue formation, enlargement, of blood-vessels, formation of new
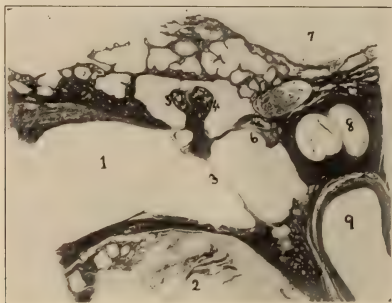
Fig. 16.
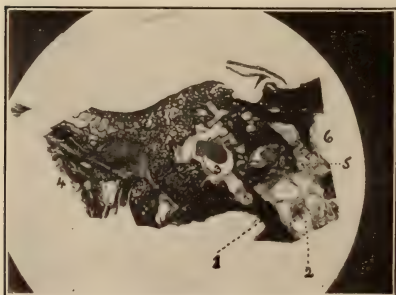
Fig. 17.

vessels, round-cell infiltration, etc. The blood-vessels are plainly seen in the picture as dark oval areas in the drum tissue. To the right of the handle of the hammer is the perforation. The latter is here not a marginal one, which is unusual in cholesteatom formation. In the middle ear is a mass of cholesteatomatous material showing the typical layer formation.

The Mastoid Process in Otitis Media Suppurativa Chronica.

When witnessing a radical mastoid operation for the first time, one unfamiliar with the pathology of this region is quite naturally surprised to see a perfectly solid sclerosed mastoid process chiseled into. At a radical mastoid operation he expects to see pathology of all kinds the moment the outer mastoid plate is removed. Exceptionally, he will see extensive necrosis, an enormous cavity filled with a pearl of cholesteatomatous material, granulations, etc. etc. Much more frequently he will see what to him appears to be a normal mastoid process of the variety which contains no air cells. The condition, however, is by no means a normal one but the result of a very slow pathological process. In the course of all chronic suppurations of the tympanic cavity, the mastoid becomes involved to a greater or a lesser extent. First there is a simple suppurative process confined to the mucous-membrane lining of the mastoid cells. Later cholesteatomatous material may wander in and cause, by means of the pressure which it exerts, extensive bone destruction. More frequently there occurs, as a result of the chronic suppuration, a new connective-tissue formation in the cells. In this connective-tissue there is finally started a new bone formation which in time leads to a complete sclerosis of the entire process.

Fig. 14.—Sagittal section through a normal adult temporal bone. The purpose of the picture is to show a normal mastoid process of the pneumatic variety.

Fig. 15.—Section of mastoid process (pneumatic variety) from a case of otitis media suppurativa chronica. (1) Two cells filled with newly formed connective-tissue and pus ; (2) a cell in which new bone formation is occurring.

This specimen shows one of the possible results of a chronic suppuration of the middle ear. The mastoid is plainly of the pneumatic variety. In two of the cells are seen masses of new connective-tissue. In the large cell below, the new connective-tissue formation has been followed by a new bone formation, which, had the individual not been operated upon, would have resulted in time in a complete sclerosis of the mastoid. The new bone is represented by the network of fine dark lines in the picture (2).

Middle Ear Suppuration in the Presence of a Permanent Obstruction of the External Auditory Canal.

In Part I. of this paper, it was stated that any suppurative process of the middle ear, in the presence of a permanent obstruction of the external auditory canal due, for example, to a complete congenital atresia, is an indication for immediate operation—the radical mastoid operation. By the surgical treatment of such a condition we accomplish two things, a cure of the suppuration and a correction of the deformity. To give

an idea of how extensive and serious the complications of a middle-ear suppuration may be in the presence of a complete atresia of the external canal, the following specimen, procured and sectioned in Berlin, is demonstrated. The patient, an insane man, died of a diffuse suppurative meningitis. Very little of his early history could be obtained. The temporal bone showed two epidermitized fistulæ of the mastoid process. The external auditory canal was completely closed by a bony atresia. Upon sectioning, it was found that the two fistulæ communicated with the mastoid antrum. The middle ear was filled with pus, cellular debris, and numerous bands of connective-tissue. With the exception of the footplate of the stapes, the ossicles had been completely destroyed. In the centre of the foot-plate was a fistula through which pus had gained access to the internal ear. The membranous labyrinth was almost entirely destroyed. In the internal auditory meatus was a quantity of pus. The nerves showed very decided degenerative changes. Here then we have a case of complete congenital atresia of the external canal in which there developed, at some time or other, an acute middle ear suppuration. Mastoiditis with fistulæ formation resulted, as pus could escape in no other direction at the time. A chronic suppuration followed. The foot-plate of the stapes became eroded. Pus escaped into the cysterna-perilymphatica of the vestibule. A diffuse suppurative labyrinthitis was caused. This condition was then complicated by the diffuse suppurative meningitis from which the patient died.

Fig. 16.—Frontal section through the entire organ of hearing. (1) External auditory canal; (2) glenoid fossa; (3) drum membrane; (4) head of hammer; (5) body of incus; (6) processus cochleariformis; (7) geniculate ganglion of the facial; (8) cochlea; (9) internal carotid artery; (10) Prussack's space.

This is a perfectly normal specimen presented with the idea of making the following pathological section more easily comprehensible.

Fig. 17.—Transverse section through the temporal bone from the case of congenital osseous atresia before described. (1) Complete osseous atresia of the external auditory canal; (2) middle ear filled with connective-tissue, pus, etc.; (3) mastoid antrum; (4) epidermis lining mastoid fistula; (5) foot-plate of stapes showing fistula through which infection passed into inner ear; (6) cysterna-perilymphatica of vestibule.

Fig. 18.—From same specimen as Fig. 17, different level. (1) Atresia; (2) middle ear; (3) antrum of mastoid; (4) epidermis lining fistula of mastoid.

This section is presented because of the fact that the epidermis lining the mastoid fistula may here be traced directly into the antrum.

THE RADICAL MASTOID OPERATION.

What is a radical mastoid operation and what do we accomplish by means of it? In a word, the operation is the removal of the posterior

wall of the external auditory canal and the major ossicles. The removal of this wall throws the external canal, the tympanic cavity, the mastoid antrum, and the remainder of the mastoid process all into one large cavity, and results in a complete epidermitization of this cavity.

During the author's stay in Vienna a patient in the General Hospital, who had several years previously been successfully operated upon for a chronic middle-ear suppuration, died. The temporal bone of the operated side was procured and sectioned. The result is seen in the following illustration.
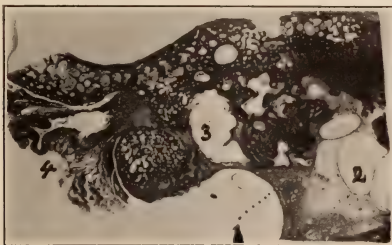
Fig. 18.
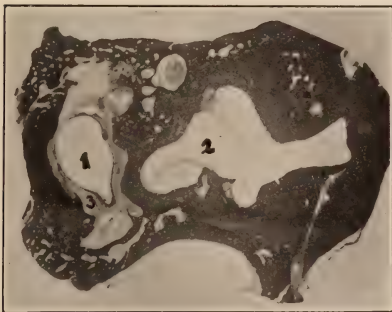
Fig. 19.

Fig. 19.—Frontal section through a temporal bone showing the result of a radical mastoid operation. (1) Middle ear or rather the radical mastoid operation cavity; (2) internal ear; (3) thick layer of connective-tissue covered by epidermis which lines the entire cavity.

LABYRINTHITIS SEROSA.

Complicating middle-ear suppuration there sometimes occurs an affection of the labyrinth called labyrinthitis serosa. In this condition

there is no entrance of pus into the inner ear, the irritation being due to toxins, either alone or in combination with bacteria. Access is gained to the labyrinth either through lymph- and blood-vessels, or directly by absorption through the intact membrane of the round window, etc. There results a coagulation of perilymph and endolymph, and a serous exudate which must be looked upon as a collateral edema. When the perilym-
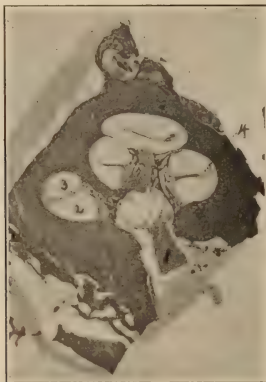
Fig. 20.
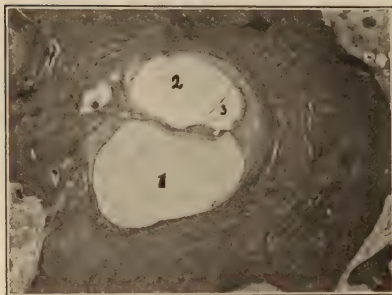
Fig. 21.

phatic spaces alone are involved, hearing may be retained throughout the entire course of the disease, the coagulated perilymph acting as an obstruction to sound conduction. When the endolymphatic spaces are also involved, there is a complete loss of hearing, the loss being either temporary or permanent, depending upon the extent to which the organ

of Corti has been injured. The labyrinth operation is not indicated in serous labyrinthitis.

Fig. 20.—Transverse section through a normal cochlea. (1) Ramus cochlearis; (2) scala tympani; (3) scala vestibuli; (4) ductus cochlearis.

Fig. 21.—Transverse section through one turn of the cochlea from a case of labyrinthitis serosa. It is seen that here the coagulation and exudation are almost entirely confined to the scala tympani. (1) Coagu-

Fig. 22.
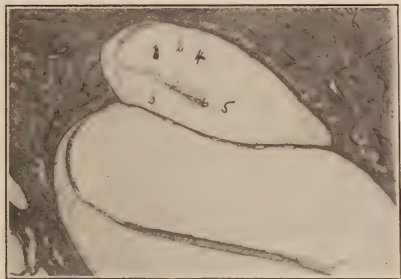
Fig. 23.

lated perilymph completely filling the scala tympani; (2) scala vestibuli, free; (3) ductus cochlearis—slight coagulation of endolymph over stria vascularis.

Fig. 22.—Transverse section through one turn of the cochlea from a case of labyrinthitis serosa. Here the entire cochlea, scalæ tympani and vestibuli as well as ductus cochlearis, is involved in the process. The ductus cochlearis is completely filled with coagulated endolymph. The organ of Corti has been destroyed. The scala tympani was, before the

section was made, filled with coagulated perilymph. In the picture it is only partially filled, one-half having been lost in the preparation. The scala vestibuli is similarly affected. In such a case the sense of hearing is, of course, permanently lost. (1) Coagulated perilymph in scala tympani; (2) coagulated perilymph in scala vestibuli; (3) ductus cochlearis filled with coagulated endolymph.

Fig. 23.—Transverse section through the apex of a cochlea showing
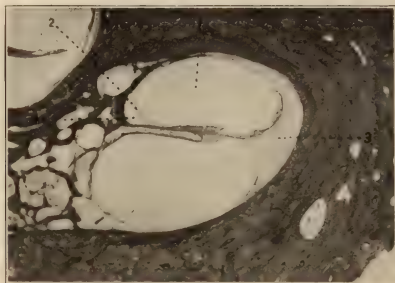
Fig. 24.
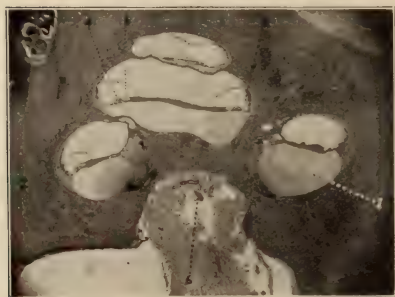
Fig. 25.

one of the results of a labyrinthitis serosa, an ectasia of the ductus cochlearis. (1) Ductus cochlearis; (2) membrana Reisnerri bulged outward into the scala vestibuli; (3) scala tympani; (4) scala vestibuli; (5) helicotrema; (6) hamulus.

Fig. 24.—Transverse section through one turn of the cochlea showing again an ectasia of the ductus cochlearis. Here the ectasia is so enormous that the scala vestibuli is almost entirely obliterated by the out-

ward bulging membrana Reisnerri. This condition is also the result of labyrinthitis serosa. (1) Ductus cochlearis; (2) membrana Reisnerri; (3) ligamentum spiralis; (4) scala vestibuli; (5) scala tympani.

ACUTE DIFFUSE SUPPURATIVE LABYRINTHITIS.

Since a diffuse suppuration of the labyrinth invariably results in a permanent loss of function of both the cochlea and vestibular apparatus,
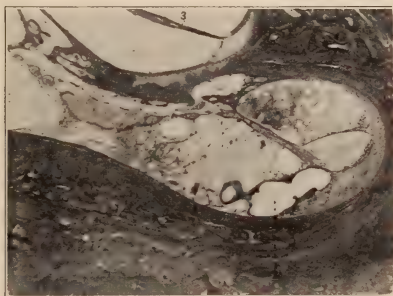
Fig. 26.

Fig. 27.

and since there is great danger of an intracranial complication, there is in such cases an immediate indication for the labyrinth operation.

Fig. 25.—Transverse section through the cochlea from a case of beginning acute diffuse suppurative labyrinthitis. In the basal turn is a coagulation of perilymph and an exudate in the scala tympani. On the left is an ectasia of the ductus cochlearis. In the second and third turns is a slight coagulation of perilymph in both scalæ. Throughout

the second turn is an ectasia of the ductus cochlearis due to an increase in the endolymphatic pressure. The membrana Reisnerri shows a slight exudate throughout the cochlea. In the ductus cochlearis is also a small amount of exudate. The organ of Corti and the membrana tectoria are still intact, but would, of course, have been completely destroyed had the patient not died before the local condition could progress so far. Hyper-
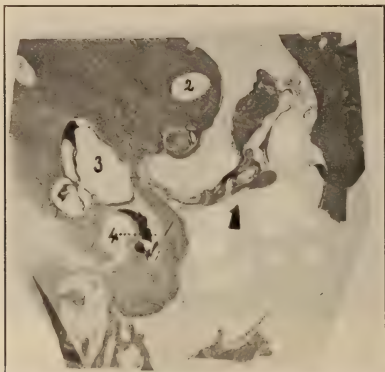
Fig. 28.
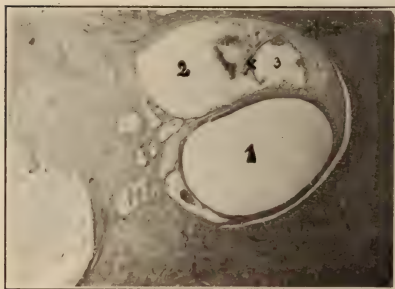
Fig. 29.

emia and perivascular exudation in the nervus cochlearis may be noticed. (1) Scala tympani filled with coagulated perilymph and exudate; (2) ductus cochlearis showing ectasia and slight exudation; (3) slight coagulation of endolymph and exudation over stria vascularis; (4) organ of Corti, still intact; (5) membrana tectoria, still intact; (6) hyperemia and perivascular exudation in nervus cochlearis.

Chronic Suppurative Labyrinthitis.

If the acute diffuse suppurative labyrinthitis is not operated upon, and the patient is fortunate enough to escape an intracranial complication, the acute inflammation either clears up or there results a chronic suppurative labyrinthitis. In this condition the patient is, of course, still in constant danger of an intracranial complication. The indication for the labyrinth operation is, therefore, the same as in the acute stage.

Fig. 26.—Transverse section through one side of the basal turn of a cochlea from a case of chronic suppurative labyrinthitis. Both scalæ are completely filled with newly formed connective-tissue and pus. The ductus cochlearis shows a slight connective-tissue formation. In the ligamentum spiralis is a marked round-cell infiltration. The organ of
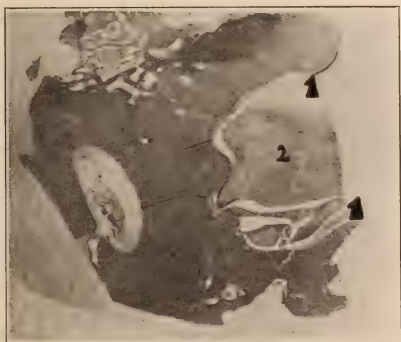
Fig. 30.

Corti has been destroyed. The crista spiralis and membrana tectoria are still intact. There is a marked exudation in the region of the membrana Reisnerri. A slight ectasia of the ductus cochlearis, due to a contraction of connective-tissue in the scala vestibuli, may be noticed. The peculiar cyst formation in the scala tympani is doubtless also due to a contraction of connective-tissue. In the second turn, which is seen just above the one described, the two scalæ are free of any pathological change, the ductus cochlearis being the sufferer here. Owing to adhesions between the membrana Reisnerri and the lamina spiralis membranacea, the ductus cochlearis has been practically obliterated. (1) Ligamentum spiralis; (2) cyst in scala tympani; (3) remains of ductus cochlearis; (4) osseous cochlea.

Fig. 27.—Section of the other side of the basal turn of specimen from which Fig. 26 was made. It is seen here that the two scalæ are free of

any pathological change, the part affected being the ductus cochlearis. Just as described in the second turn of Fig. 26, the ductus cochlearis is almost obliterated as a result of adhesions having formed between the membrana Reisnerri and the lamina spiralis membranacea. (1) Adhesions.

LABYRINTHINE HEMORRHAGE.

Does a sudden loss of hearing accompanied by disturbance of equilibrium, spontaneous nystagmus to the healthy side, loss of caloric reaction, etc., always constitute an immediate indication for the labyrinth operation? By no means. For example, a hemorrhage into the internal ear may cause all the aforementioned symptoms, and in no way be an indication for surgical interference. In the presence of a suppurating middle ear the condition would indeed be confusing, and the writer knows of no way in which the internal ear hemorrhage could be differentiated from a suppurative labyrinthitis (where the hemorrhage is unilateral), with the possible exception of cases where the onset is observed: rapid in suppurative labyrinthitis and instantaneous in hemorrhage.

Fig. 28.—Frontal section through the middle and internal ear from a case of labyrinthine hemorrhage. In the vestibular apparatus, as well as in the beginning of the cochlea, is seen masses of coagulated blood. (1) Middle ear; (2) section of a semicircular canal showing on the left a small amount of coagulated blood; (3) cysterna perilymphatica. To the left of this is the utriculus, partially filled with a blood-clot; (4) beginning of cochlea showing large masses of coagulated blood.

TUBERCULOSIS OF THE LABYRINTH.

There exists one form of chronic suppurative labyrinthitis which is better left alone. That is tuberculosis of the inner ear. The reason that the labyrinth operation is not advisable in such cases is because of the great tendency to a development of tubercular meningitis following the procedure.

Fig. 29.—Transverse section through one turn of the cochlea from a case of tuberculosis of the labyrinth. The scala tympani is practically free of pathological change. In the scala vestibuli is a quantity of pus and connective-tissue. In the latter are seen numerous newly formed blood-vessels. To the connective-tissue is firmly bound the membrana Reisnerri. Contraction of the connective-tissue has resulted in an ectasia of the ductus cochlearis. In the latter is noticed a quantity of pus in three different locations: at the angle formed by the membrana Reisnerri and ligamentum spiralis, over the stria vascularis, and resting upon the lamina spiralis membranacea. The organ of Corti has been destroyed. The crista spiralis is still intact. The surrounding bone shows

no pathological change. (1) Scala tympani; (2) scala vestibuli; (3) ductus cochlearis; (4) membrana Reisnerri.

Neurofibroma of the Nervus Acusticus.

Primary new growths of the inner ear are very much rarer than the secondary neoplasms which originate either in the middle ear or cranial cavity. The primary growth occurring most frequently is the neurofibroma of the nervus acusticus. The symptoms arising from same are identical with those caused by other tumors of the posterior cranial fossa, and have been described in Part I. of this paper.

Fig. 30.—Frontal section through the internal auditory meatus from a case of neurofibroma of the nervus acusticus. The fibrous tumor mass in the internal meatus is only the pedicle of the original growth; the largest portion, which rested upon the posterior surface of the pyramid, having been removed prior to sectioning. It is seen that the internal meatus is many times its normal size, the pressure of the tumor pedicle having resulted in this deformity. (1) Internal auditory meatus; (2) neurofibroma of nervus acusticus.

Metropolitan Building.

EXCISION OF THE CLAVICLE.

By Frank K. Boland, M. D., of Atlanta,

Professor of Operative and Clinical Surgery, Atlanta School of Medicine.

Excision of the clavicle is a comparatively rare operation. Carson,[*] reporting a case, stated that up to 1904 he had been able to find records of but 49 cases of complete or partial removal of the bone, and that not a great many cases had been published since that time.

In the writer's case the clinical diagnosis was osteosarcoma, but the

Excision of right clavicle. Six months after operation.　　Excision of right clavicle. Six months after operation.

laboratory report did not corroborate his opinion. The patient was a farmer, aged twenty-one, referred by Dr. Frank Wells, of Hapeville, Georgia. His family and personal history were negative. For the past month or six weeks he had noticed a swelling on his right collar-bone, which was growing rapidly. It pained him constantly, and kept him awake most of the night. He had done a great deal of hunting during the preceding months, and lately had been doing some plumbing; and he attributed his trouble to the irritation caused by the pressure of a heavy gun and pipes carried on his shoulder.

The tumor on the clavicle was near the sternal end. It was about the

*Interstate Medical Journal, August, 1911.

size of a hen's egg, smooth and hard. There were no signs of the "simple inflammation" which the pathologist reported. There was no discoloration, and the skin was freely movable over the mass. There was some tenderness on pressure.

Operation was performed June 23rd, 1911. The incision first was made directly over the mass, and as examination excluded simple inflammation as the cause of the trouble, the entire length of the bone was exposed. The acromial end first was freed, and then the muscles and ligaments were separated up to the sternal articulation. The bone with its periosteum was thus removed *en masse*, with little difficulty. There was but little hemorrhage, and there were not more than a half dozen small vessels to ligate. By keeping close to the bone, the writer not only did not have to deal with any large vessels or nerves, but did not see any. The amount of raw space left after such an excision is astonishing. It is as much as that following a breast amputation. On account of this, the writer inserted a cigarette drain which was removed after forty-eight hours. The wound was closed with interrupted silk-worm gut sutures, and a Velpeau bandage applied. Healing was complete in two weeks.

The writer reports this operation to call attention to the surprising case with which it was done and to the perfect functioning result which followed. Several writers speak of excision of the clavicle as an exceedingly difficult and dangerous operation, especially when the bone and periosteum are to be removed *in toto*. A subperiosteal excision, as might be done for necrosis, would of course be a simpler procedure. The writer can readily see that in the presence of a very large growth, with pressure against the important and delicate structures which lie underneath the bone, the operation might be most formidable. But such a case, too, might not be far from the inoperable.

The writer's case was ideal in that the condition was promptly recognized by the attending physician, and operation at once consented to. Six months after operation the patient has no signs of recurrence, and there is absolutely no deformity except the slight depression made by the absence of the bone. There is no drooping of the shoulder and no lowering or winging of the scapula. The patient is able to use his arm as well as ever in every respect. Abduction is unimpaired. Three months after operation he could resume his position on a baseball team, and with his right arm could throw a man out at home-plate from the field.

THE RELATION OF DRAINAGE OPERATIONS TO THE PUBLIC HEALTH.*

By CREIGHTON WELLMAN, M. D., of New Orleans,
Head of the Department of Tropical Medicine, Hygiene and Preventive
Medicine, Tulane University.

Definition lies at the threshold of all knowledge, and it were therefore well at the very beginning of our discussion to ask ourselves this question: What is drainage?

This question, if put to the engineer, the agriculturalist, the civic administrator and the sanitarian, would evoke widely divergent answers, each naturally colored by their varying professional points of view. For the purposes of this discussion I may, therefore, as a professed hygienist, be allowed to frame my own definition in the following words:—To the sanitarian, drainage consists of the natural or artificial lowering of the ground water, which results in an entire change in the biological order dependent upon soil conditions and affects in a marked degree the public health.

Submerged or water-logged earth is cut off from the circulation of its normal ground water and soil air, and may be likened to a closed and darkened dwelling. By drainage this fatal stagnation and seal is removed; and, instead of air-shunning germs and creatures, we find air-loving cereal and fruit, and health producing microscopic helpers making their abode therein. It is like throwing open the doors and windows of the deserted house, and allowing the free air and sunshine to enter.

Now it is true that drainage operations on a large scale are as a rule carried out to meet the demands of successful agriculture and not because of solicitude for the public health. In other words, the sanitary improvement is often a by-product of the economic gain. But while a by-product, it is no less a real and substantial advantage, and as such should receive adequate recognition in a movement like the present.

Indeed, I would be sorry to think that this Congress is devoted simply to the financial and business aspects of the vast problem of waste-land redemption; and did I attribute such a sordid single motive to the gentlemen composing it, I would not be here to-day. I am sure that the broader, more stateman-like and human objects of the prevention of needless sickness, suffering and death, and of the conservation of the

vitality and efficiency of the present and future generations of our citizens, also enter largely into your plans and ideals.

The discussion of these aspects of the drainage movement needs, therefore, neither apology nor explanation, and I shall accordingly proceed to their consideration without further preface.

In the first place, we must remember that such a thing as a perfectly dry soil does not exist. Even so-called "dry" dust contains one-tenth of its weight of water. This moisture remaining in the soil after ordinary drying is known as hygroscopic moisture, and, even in well-drained soils, has added to it considerable water from deeper strata; this water is continually being exhaled into the air and assists in maintaining a certain amount of atmospheric saturation.

In other words the soil may be divided into three zones according to the amount of contained moisture—namely:—

(1)   The zone of ground water based on an impervious stratum.
(2)   The zone of capillary soil water.
(3)   The zone of evaporation.

You will note that I have mentioned a zone of capillary soil water. It is well known that the soil above the ground-water level contains a certain amount of water held there by capillary attraction, and also that, according to Jurin's law, this capillary attraction is most marked in soils of fine texture. Consequently we can decrease the surface dampness of the soil in the two following ways:—

(1)   By lowering the level of the ground-water.
(2)   By cultivation, which implies loosening or coarsening the texture of the ground.

But it is often necessary to combine these two devices on account of complete water-logging or even submergence of the soil. If cultivation can once be started the presence of the crops is of great assistance in the reduction of surface moisture. e. g., one acre of wheat exhales about 500,000 lb. of water during the season; one acre of clover exhales about 1,000,000 lb. of water during the season; one acre of cabbages exhales about 5,000,000 lb. of water during the season.

So it will be seen that in wet countries drainage and cultivation go hand in hand with the decrease in soil moisture and consequently of air saturation.

Now it is well agreed among sanitarians that water-logging of the soil is unfavorable to all affections of the respiratory system, including pulmonary tuberculosis, bronchitis, pneumonia and similar diseases. For example, we may take the well-known fact that physicians send their consumptive patients to dry climates, i. e., localities where the saturation of the air is low.

The effect of a high subsoil water on other diseases might also be cited; for instance, the recent German experiments with the germ of typhoid fever show that it will live eighty-eight days in wet soil, but only twenty-eight in moderately dry soil.

But perhaps the most striking example of the beneficial effects of drainage on the public health is the attendant diminution in malarial fevers. This point will be taken up more fully a little later.

This, too, must not be lost sight of, that great gain in the general health and vigor accrues from extensive subsoil drainage. In our own city of New Orleans the average mortality per thousand from 1808 to 1832 ran about 40 to 80. In 1832 the frightful epidemics of cholera (a disease due to the absence of good water and drainage systems) and yellow fever ran the mortality up to the terrible figure of 147 per thousand, or nearly one out of every six inhabitants. In 1853 again another similar epidemic claimed a toll of some 125 per thousand. After 1863 the mortality fell to 30 to 40 per thousand. After 1878 it still further decreased to 25 to 30, the decrease proceeding *pari passu* with the inauguration of sanitary sewerage and drainage improvements until to-day I am informed that our average death-rate per thousand runs from 14 to 15, in some months running as low as 11, thus making us compare favorably with the best equipped cities in the United States in this regard.

What has brought about this happy result? Many factors doubtless have contributed, but none will deny that drainage has played a mighty part in the victory.

We spoke a few moments ago about the malaria question, and perhaps it will be of interest to turn for an instant from these more general considerations to the discussion of this specific integer in the problem of drainage and health.

It may not be known to some of my hearers that malaria costs us $100,000,000 each year from deaths, loss of labor, reduced values in real estate and in other ways, but such is the fact.

And yet malaria is in every way a preventable and eradicable disease. It is quite as possible to rid ourselves of malaria as it was to rid ourselves of yellow fever. Of course, this spells money, but, where money is provided, the end can be accomplished.

For instance, Khartoum, once a "white man's grave," has under the direction of Dr. Andrew Balfour since 1905 been made practically mosquito free, and a case of primary malaria is a rare thing, worthy of surprised comment. Again, at Ismaila, under Sir Ronald Ross, malaria was eradicated entirely. In 1901, antimalaria drainage measures were inaugurated; in 1903 there were but 214 cases of malaria. In 1904 there were only 90, since 1905 there have been *no* cases! Incidently the reports from Ismaila show that the increased drainage has distinctly increased the yield of the cultivated areas.

But it is in the Panama Canal Zone that we have the most thorough-going and sweeping illustration of the sanitary advantages accruing to a community from the prosecution of systematic drainage measures. Here a knowledge and application of the principles of preventive medicine have made possible the greatest engineering feat of history. This is

freely admitted on all sides. In the words of Sir Ronald Ross the canal is being "dug with a microscope."

Let us consider for a moment the part that drainage has played in this great achievement. Before Colonel Gorgas took matters in hand, swamps covered with green slime extended to the present railway station in Colon, the houses were set up on piles, and the mosquitoes were in clouds. In Panama one could not sit in the parks on account of these pests. Now the swamps have been drained, the city has been sewered and made sanitary, and not a mosquito is in evidence. While in Panama recently, I could not find a single specimen in the hotel although it was not screened, and I slept without a mosquito-bar over my bed.

During the French régime the mortality at times reached the frightful rate of 600 per thousand. Now it is something like 14 or 15 per thousand, or about the average here in the United States. The entire English-speaking world should be proud of this phenomenal sanitary triumph, one of the greatest factors of which is the steady lowering of the malarial curve during the progress of the greatest soil-moving scheme in history --and disturbing of the soil has from time immemorial been regarded as favorable to outbreaks of malaria. The statistics show that in a tropical country, once as intense a focus of malaria as can be imagined, the canal has been built with no greater number of days lost from disease than if we were building it at home. While not the only factor in the situation, yet all must acknowledge that drainage enters very largely into the count.

While in the Canal Zone, the evidences and effects of drainage greet one on every hand. Subsoil drains, open concrete drains, simple ditches kept free from vegetation, sewerage systems and all other devices for lowering the ground-water, are encountered in turn.

The admirable result is such as to open a wide field for suggestion and speculation.

I am going to make a proposal to this honorable body. I suggest that this Congress petition the President and the Congress of the United States in session to secure a strip of land ten miles by forty-seven miles in size (in other words a replica in area of the Panama Canal Zone) in the worst portion of the Mississippi delta. Then ask that the same amount of money it has taken to make the Canal Zone healthy be expended under the highest expert advice in draining and otherwise rendering healthy this same strip of land.

The Mississippi delta is at once one of the richest and most useless tracts of land in the civilized world. And why? The answer can almost be summed up in the single word malaria. Now, if a portion of this hopeless and abandoned territory be reclaimed according to the most modern practice, and with abundant funds to guarantee the work being done in the best manner possible, we should have the most striking object-lesson to the world that is conceivable, an object-lesson that would forever put at rest all question or quibble as to the sound-

ness of our claims that the drainage of our waste lands is to-day the greatest need of the South. Think what it would mean to see a section cut out of the heart of this lost and gloomy wasted wilderness and brought, by the means of adequate drainage, at one bound into the proud estate of a rich, productive, healthy abode of mankind.

This would have to be conceived and arranged with due regard to the vested rights of all concerned, and under such restrictions as would render impossible the exploitation of the scheme for private aggrandizement; but I consider that some such device would do more than anything else for the objects we are here to advance by this Congress.

Finally, I would invite the attention, of those behind this great movement for conservation of our land through drainage and reclamation, to what to me is a vital issue, and to what certainly has been too much neglected during the past of this and similar propagandas. I refer to the necessary co-operation between the agricultural, business and sanitary interests involved.

Drainage and reclamation are but a part of the great problem of the conservation of our national resources, and among our national resources the lives and health of our citizens stand or should stand first. How can we call ourselves financiers, or business men, or statesmen, or good citizens, while we allow ourselves to pay one and a half billions each year as the cost of preventable disease? How can we call ourselves far-sighted, or keen-minded, or modern, while we listlessly watch more than six million lives being needlessly destroyed in our midst every decade?

I urge upon you the necessity of looking at this whole question of drainage, reclamation and conservation in a broad and unselfish light. I suggest that you take into your counsels those experts who are interested in the welfare of humanity from every side, including the greatest minds in public health and sanitary science, that your efforts and plans may include more than a mere campaign for better crops and greater cities.

LIGATURE OF THE INTERNAL MAMMARY ARTERY FOR STAB WOUND.

By NORMAN B. CARSON, M. D., of St. Louis.

In looking up the literature of ligation of this artery, the writer was surprised to find so few cases reported, and has, therefore, been prompted to report the following case which came under his observation.

While on a visit last Christmas to Dr. S. P. Martin, of East Prairie, Mo., the writer was asked, shortly after his arrival, to accompany Dr. Martin about four miles out into the country to see a man who had been stabbed about five hours before, and who was said to be in a bad condition. Upon arrival at the patient's house, we found a large, well-developed man about thirty years of age, with a wound in the right chest, between the third and fourth ribs, about three-quarters of an inch in length, and three-eighths of an inch in breadth. This wound had evidently been made with a narrow-bladed knife, which, entering the pleural cavity, had wounded the lung, and in its passage cut the cartilage of the third rib where it joined the sternum. The patient's clothes and the bed-clothes were saturated with blood, and the man was in a state of collapse. His home was some distance from the place where the cutting was done, and in transporting him, he had been exposed to a cold rain which was falling at the time.

Having made a superficial examination, as quickly as possible, we found a hematopneumothorax of the right side, with the chest about half full of blood, and as evidence of the wounding of the lung, the subcutaneous tissue around the wound was emphysematous. After cleansing the parts as well as circumstances would allow, we sealed the wound with a large bichloride dressing and applied a tight bandage around the chest in the hope that by limiting the motions of the chest, we might, with the assistance of the contained air compressing the artery, prevent a recurrence of the hemorrhage which had ceased before our arrival.

The next day the writer again saw the patient for Dr. Martin, and found that after a comfortable night he had a good pulse, and was in every way doing well. As the bandage was loose, the wound was redressed and the bandage reapplied. The patient was not seen again until Friday, four days later (although daily reports were received), when Dr. Martin visited him and found him doing well. Saturday early, while taking a drink, he choked, and had a coughing spell which caused a recurrence of the hemorrhage.

Saturday they decided to bring the patient into town, and in order to

accomplish this, he had to be carried through the rain on a stretcher, over a mile and a half, on account of the bad condition of the roads. He arrived in town after dark. Sunday morning, as he was still bleeding at intervals, it was decided to tie the artery, and thus give him the only chance to recover, although a slight one.

Assisted by Dr. S. P. Martin, Dr. Albert Martin giving the ether, the writer enlarged the original wound, but found it impossible to see the artery on account of the blood, which was being forced out through the opening by the coughing of the patient. He then quickly resected about an inch of the seventh rib, well back, and emptied about three pints of blood from the pleural cavity. He was then able to see the bleeding end of the artery, close up to the sternum, but could not catch hold of it. The cartilage of the third rib was then resected, which enabled the writer to catch and ligate the divided end of the artery without further trouble. When the chest was opened, the lung was found to be only partially collapsed, on account of old adhesions. It felt firm and did not crepitate.

The patient was taken from the table very little worse than before the operation. He recovered from the operation well, but died on January 4th, 1912, of septic pneumonia caused by exposure and unfavorable conditions.

Schwarz, in his Koenigsberg dissertation, mentions 52 cases of wounds of the internal mammary artery, which had been reported during the last century. Seven of these injuries occurred during operation. "Of the 45 remaining cases, 9 died of acute hemorrhage, which in 4 came from a wounded lung, heart, or other neighboring structures, in 4 from the artery itself, and in 1 from an indeterminate source. Of the 36 who survived the immediate effects, the wound became infected in 24, of whom 18 died and 6 recovered. Of the 12 with unaffected wounds, 8 recovered and 4 died. There were 21 cases of secondary hemorrhage, 16 in the infected groups, 5 in the unaffected group."[*]

Judging from the few cases reported, wounds of the thoracic arteries must be few as compared with chest wounds. Only 15 cases of wound of the intercostal arteries were reported during the civil war.

Jopson[**] reports a case in many respects similar to the case reported by the writer. Dr. Ed. Martin, at the same time, reported another case of internal mammary artery from gun-shot wound.

The writer fully agrees with Jopson in advising primary ligature of the artery as soon as possible after the injury, although the bleeding may have stopped.

Le Conte doubts, when the artery is injured as low as the fourth or fifth interspace, if the bleeding will be severe enough to necessitate a ligature, but if the injury is as high as the second interspace, death will

*Annals of Surgery, p. 949, 1906.
**Annals of Surgery, 1906.

result unless the artery is ligated immediately, and if the injury is below the region of the trianguli sterni muscle, hemorrhage may be controlled by packing against the muscle.

Schwarz's experiments on animals show that hemorrhage from the internal mammary artery, when cut in the second interspace, is practically equivalent to making an opening of the same size as that vessel in the subclavian artery.

In cases of wound of the internal mammary, the writer is convinced that the artery can be reached much more satisfactorily and quickly by resecting the costal cartilage than either by enlarging the original wound, or cutting down on it from above. In many cases it will be necessary to empty the pleural cavity before the artery can be tied, on account of the blood, which is forced out by the coughing of the patient during the administration of the anesthetic, obscuring the parts so that the end of the artery cannot be seen.

When the lung alone is wounded, if the wound is near the surface and no large vessels are involved, the pneumothorax will stop the bleeding, but if the hemorrhage comes from a large vessel, nothing other than a free opening of the pleural cavity, which will afford access to the lung, will enable us to control the bleeding. Fortunately the introduction of the different pressure apparatuses, and especially the intratracheal insufflation method of Metzler and Auer will enable us to treat these cases with some chance of success; and from the writer's experience with wounds of the thorax, and his work upon animals, he is very sure that many of these cases, which have heretofore had a fatal termination, may be successfully treated.

SPUTUM DIAGNOSIS OF PNEUMONIA.

By August J. P. Pacini, Ph. C., M. D., of Memphis,
Director of the Laboratories University of Tennessee College of Medicine.

The reaction to be described was observed persistently present in pneumonic sputa during some research investigations concerning the nature, source and characters of sputum pigments relative to their diagnostic value.

After noting the usual physical characters of the specimen for examination, including, of course, the color, odor, consistence, etc. etc., a portion of the sputum is mixed with distilled water in the proportion of one volume of sputum to ten volumes of water, and agitated in a suitable container for five minutes. The mixture is filtered through paper and preserved for the test.

A one per cent. aqueous solution of methyl violet constitutes the reagent necessary for this reaction, and should be prepared as stock and ready for use.

To a test-tube containing 10 c.cm. of distilled water add 5 drops of methyl-violet solution and mix thoroughly. Then add, drop by drop, 10 drops of the filtrate obtained as above described.

In the event of a positive reaction, the methyl violet assumes a distinct red color. Nothing short of a red color constitutes a reaction.

This reaction is present only in the sputum of those patients subject to the onset of pneumonia. It is due to a specific disintegrated blood pigment characteristically present in the sputa of such patients, and precedes the expectoration of the classic "rusty sputum" by several days.

Applied to over 1,200 specimens, where the ultimate diagnosis was confirmed and established as pneumonia, an error of 2 per cent. existed.

Because of the combined accuracy and simplicity involved in the diagnostic method, it should prove useful to the practitioner who does not even attempt laboratory diagnosis because of time and training necessary for such work.

Further developments concerning the chemistry, physiology and pathology connected with this reaction will appear upon the completion of more detailed researches in this direction.

MEDICAL AND SURGICAL PROGRESS.

THE VACCINE TREATMENT OF TYPHOID.

A REVIEW OF RECENT LITERATURE.

By Wm. Engelbach, M. D., of the Editorial Staff.

1. Allen: Vaccine Therapy: Its Theory and Practice. Third Edition. pp. 158-159.
2. Albert: Discussion of Dr. Park's Paper. (*Journ. Amer. Med. Assoc.*, p. 982, 1908.)
3. Brem and Watson (*Archiv. Int. Med.*, November, 1911).
4. Callison (*New York Med. Journ.*, July 15th, 1911).
5. Chantemesse (*Gazette Médicale de Paris,* December 27th, 1911).
6. Chauffard (*Bulletin de L'Acad. de Méd.*, January 24th, 1911).
7. Connell (*Amer. Journ. Med. Sciences,* Vol. CXXXVII, p. 637, 1909).
8. Crowe (*Bulletin Johns Hopkins Hospital*, XIX, p. 109, 1908).
9. Cummins, Fawcus and Kennedy (*Journ. Royal Army Med. Corps,* London, Vol. XIV, p. 351, 1910).
10. Dehler (*Muench. med. Wochenschr.*, No. 43, 1907).
11. Delarme (*Bulletin de L'Acad. de Méd.*, January 24th, 1911).
12. Engelbach (*Lancet-Clinic,* February 3rd, 1912).
13. Forster (*Verhandl. d. deutsch. Path. Gesellsch.*, p. 163, 1907).
14. Fletcher (*Journ. Amer. Med. Assoc.*, April 8th, 1911).
15. Fletcher (*Journ. Amer. Med. Assoc.*, April 15th, 1911).
16. Fraenkel (*Deutsch. med. Wochenschr.*, October 12th, 1893).
17. Frosch (*Klin. Jahrb.*, XIX, p. 537, 1908. Cited by Simonds (*Amer. Journ. Med. Sciences,* CXL, p. 247, 1910).
18. Gregg (*Boston Med. and Surg. Journ.*, July 16th, 1908).
19. Grimme (*Muench. med. Wochenschr.*, No. 43, 1907).
20. Hammond (*Journ. Amer. Med. Assoc.*, 48, 1909).
21. Hektoen (*Journ. Amer. Med. Assoc.*, September, 1911).
22. Hollis (*New York Med. Journ.*, July 5th, 1911).
23. Houston (*British Med. Journ.*, January 14th, 1899).
24. Huggenberg (*Corr. Bl. fuer Schweiz. Aerzte*, XIX, p. 635, 1908).
25. Irvin and Houston (*Lancet,* January 30th, 1909).
26. Kelsch (*Bulletin de L'Acad. de Méd.*, January 24th, 1911).
27. Knich and Ringsheim (*Deutsch. Archiv fuer klin. Med.*, Vol. 101, Nos. 1 and 2).
28. Landouzy (*Bulletin de L'Acad. de Méd.*, January 24th, 1911).
29. Ledingham, A. and J. C. G. (*British Med. Journ.*, January 4th, 1908).
30. Leishman (*Journ. Royal Army Med. Corps,* Vol. XII, p. 145, August, 1910).
31. Litterer: Discussion of Dr. Park's Paper. (*Journ. Amer. Med. Assoc.*, p. 982, 1908).

32. Lumsden and Woodward (*Journ. Amer. Med. Assoc.,* p. 749, March 6th, 1909).
33. Meader (*Bulletin Johns Hopkins Hospital,* XXI, p. 280, 1910).
34. Meakins and Forster (*Canadian Med. Journ.,* June, 1911).
35. Netter (*Bulletin de L'Acad. de Méd.,* January 24th, 1911).
36. Niepraschk (*Zeitschr. fuer Hyg. und Infektionskrankh.,* LXIV, p. 454, 1909).
37. Park (*Journ. Amer. Med. Assoc.,* p. 981, September 19th, 1908).
38. Phalen (*Journ. Amer. Med. Assoc.,* January 6th, 1912).
39. Roux (*Bulletin de L'Acad. de Méd.,* January 24th, 1911).
40. Russell (*Boston Med. and Surg. Journ.,* Vol. XLXIV, p. 1, No. 1, 1911).
41. Sadler (*Journ. Vaccine Therapy,* Vol. 1, No. 1, January, 1912).
42. Scheller (*Zentralbl. fuer Bakteriol.,* No. 5, p. 385, 1908; Abs. Editorial, *Journ. Amer. Med. Assoc.,* p. 1986, June 13th, 1908).
43. Semple (*Lancet,* June 12th, 1909).
44. Semple (*Lancet,* June 25th, 1910).
45. Semple (*Journ. Vaccine Therapy,* Vol. 1, No. 2, February, 1912).
46. Semple and Matson (*Lancet,* August 14th, 1909).
47. Smallman (*Journ. Royal Army Med. Corps,* August, 1910).
48. Soper (*Journ. Amer. Med. Assoc.,* p. 2019, June 15th, 1907).
49. Spooner (*Boston Med. and Surg. Journ.,* January 15th, 1911).
50. Stone (*Journ. Amer. Med. Assoc.,* November 12th, 1910).
51. Stoner (*Amer. Journ. Med. Sciences,* February, 1911).
52. Thornot (*Bulletin de L'Acad. de Méd.,* January 24th, 1911).
53. Wassermann and Citron (Quoted by Hektoen in *Journ. of Infectious Dis.,* September, 1911).
54. Watters and Eaton (*Med. Record,* May 6th, 1911).
55. Widal (*Bulletin de L'Acad. de Méd.,* January 24th, 1911).
56. Wilson (*Journ. Royal Army Med. Corps,* August, 1910).
57. Wright: Studies in Immunization, 1909.
58. Wright and Lamb (*Lancet,* December 23rd, 1899).
59. Vaillard (*Bulletin de L'Acad. de Méd.,* January 24th, 1911).
60. Vincent (*Bulletin de L'Acad. de Méd.,* January 24th, 1911).

No subject has presented more fascinating development than the specific treatment of typhoid. While this treatment is not new, the advances made in the last two years have been so rapid and startling that one can prophesy with considerable safety that it will be only a short time until this treatment will be accepted for active typhoid. The prophylactic treatment of typhoid by vaccination, and the treatment of chronic local typhoid lesions present in "typhoid-carriers" and "contact-carriers" by means of vaccines has already been fairly well established. The vaccine treatment of active typhoid has not proved successful up to the present time. The above investigations, however, pertaining to the prophylactic and typhoid-carrier treatment, had proved, without a doubt, that the specific immune bodies can be created by vaccine treatment; consequently the only requirement for the treatment of active typhoid is an abundant production of these antibodies early in the course of the disease. Problems, concerned with the stimulation of this early immunization in active typhoid, deal principally with improvement in technique, such as preparation of vaccine, dosage and administration of the same.

In the following review on this subject, the literature has not been greatly condensed,—some articles being given almost verbatim. This

was considered necessary on account of the difficulty of abstracting these articles without a great loss of the essentials of the subject. Furthermore, much of this literature deals in detail with the pathogenesis, evolution and development of typhoid infection in the human body, and describes the method of immunization produced by the same with so much new and profitable knowledge as to add considerably to the general understanding of typhoid fever. In order to give the proper introduction to the elementary facts concerning the action and results of vaccine treatment, all this preliminary knowledge, bearing upon the theories of typhoid immunization, was deemed worthy of exhaustive consideration.

As Phalen pointed out to those not wholly familiar with the subject, the theory of immunization by bacterial vaccination is nearly as old as the science of bacteriology itself, dating from Pasteur's experiments with the anthrax bacillus in the early eighties of the last century.

It is now twenty-five years since Fraenkel and Simonds immunized rabbits against typhoid, and fifteen years since Pfeiffer and Kolle and Wright almost simultaneously gave the first typhoid inoculations to man. Partly on account of faulty methods of preparation of the vaccine, and partly on account of false premises and prejudice, typhoid inoculation made little headway, and, for a time after the South African war, was somewhat discredited.

There are so many features of the subject that few can be considered, and these but briefly. The first which will be mentioned is the preparation of the vaccine. Of the many types, Phalen speaks only of that in use in the United States Army, which is prepared by Major Frederick F. Russell in the laboratory of the Surgeon-General's office in Washington. The organism used is from an old culture which has ceased to be pathogenic, and which produces an abundant growth on agar. It is inoculated on agar in specially constructed flasks giving a known surface of media. After eighteen hours' incubation the agar cultures are washed off with the normal salt solution, put into flasks, and the culture killed by subjecting it to 55-56° C. over a water-bath for one hour. While sterilization is taking place, a count is made of the bacterial suspension for the purpose of standardizing, after which it is diluted with normal salt solution, so that 1 c.cm. shall contain 1,000,000,000 bacilli, and 0.25 per cent. tricresol is added. It is tested by bacteriological methods for both aerobic and anaerobic bacteria, and, as a further measure of safety, inoculations are made into guinea-pigs. It is then put up in sealed ampoules containing 1 to 25 c.cm.

The immunizing dose of the vaccine is given in three injections at intervals of ten days. The first injection is of 0.5 c.cm., while the second and third are of 1 c.cm. each. The injection is given with an ordinary hypodermic syringe into the deltoid muscle near its insertion. The site of the inoculation may be previously sterilized by any of the ordinary means, but in the military service where large numbers are treated at a time, it is customary to paint the skin with tincture of iodine before the inoculation, and touch the needle-wound with the same solution afterward.

The reaction following the inoculation is usually not severe. Locally there is an area of hyperemia around the wound made by the needle, and more deeply there is a sharply circumscribed area of induration, which is somewhat tender. Movements of the arm, calling the deltoid into play, are painful, and there is some stiffness. Exceptionally there is some swelling and tenderness of the axillary glands, but no case of suppuration

has ever been reported. Sloughing around the site of injection never occurs. An urticarial rash is one of the less common results. It usually involves the chest and abdomen of the patient and may persist for a week or more. Herpes facialis has been reported a few times. Some constitutional disturbance is usual, though frequently entirely absent. This consists only of feverish sensations and malaise in the lighter cases. The more severe reactions, classed as moderate, show a fever up to or above 101° F., chills, slight nausea, profuse perspiration and some nervous disturbances. Hysterical attacks have been reported, and Phalen has seen several cases in which there were attacks of dyspnea, which were apparently of hysterical origin. The onset of the reaction is usually within six hours; it is at its height in twelve hours, and has subsided in twenty-four hours, leaving only a little stiffness of the arm. Reaction is much more constant and more severe after the first injection than after the subsequent ones, though the reaction after the second is often the more severe on account of the increased number of bacilli. Children, though complaining rather uniformly of the local pain, have usually little general reaction.

At the Columbus Barracks recruit dêpot, each recruit is vaccinated against smallpox and given the first typhoid inoculation on the day of enlistment. At the time of the second inoculation, ten days later, many of the men are suffering with vaccinia, so that in these men reaction from the second inoculation is frequently moderately severe, but even in these cases the ill effects are quite transient. With this rather unavoidable exception the inoculations are not given to men suffering from any illness. This precaution is an important one, for the vaccine has proved that it is not without ill effects on the sick, and the aged and debilitated should also be excluded from its use. The report of the Surgeon-General of the United States Army for 1911 cites the case of a man who, after being given the first inoculation, gave a severe reaction followed by symptoms of acute pulmonary tuberculosis. It was evident that a latent infection had been stirred up to activity by the effects of the injection. Severe reaction, coming on quickly after the injection, with fever of 103° F. or more, together with gastro-intestinal symptoms, occurs very rarely. Russell places the percentage of these reactions at 0.1 per cent., and attributes them to the introduction of the vaccine into a vein.

It will be seen that the discomfort and pain from the typhoid inoculation is comparable only with that of the lighter cases of vaccinia following smallpox vaccination. If it can be shown that it offers a comparative degree of immunity to a much more imminent danger, why should not its use become equally general?

The typhoid immunization, at first a voluntary measure in our army, has since July 1st, 1911, been made compulsory for all officers and enlisted men under the age of forty-five years, who have not had an authenticated case of typhoid fever.

The immunization of the army has proceeded rapidly until, at the present time, somewhat over 60,000 men have completed the necessary three inoculations. It is to the records of our army, together with those of Great Britain and Germany, that we must look for evidence of the practical value of the procedure. It was first introduced as a practical measure, on a large scale, by Sir Almroth Wright who inoculated about 100,000 men during the South African war. No reliable records were kept, and such as were available seemed to discredit somewhat the value of the procedure; and its use in the English army was abandoned.

Wright, however, collected data concerning about 20,000 of the men who had been inoculated; and from this he was convinced that the vaccination had resulted in a dimunition in the typhoid-rate. Though the public confidence in the vaccination was badly shaken, Wright, with the aid of a commission headed by Sir William Leighman, succeeded in rehabilitating the practice and in getting its use restored in the British army in 1904. The latest figures available from this service are those of Col. R. H. Firth, R. A. M. C., covering the colonial army in India during the years 1906 to 1910 inclusive. He gives the rates of typhoid and of deaths therefrom, and of men inoculated per thousand for these years, as follows. In 1906, the typhoid-rate was 15.6 and the death-rate 3.19 among a military population, 66 per thousand of whom had been inoculated. In 1907, the typhoid-rate was 13.1 and the death-rate 2.77, the inoculated population being 143 per thousand. In 1908, the typhoid-rate was 14.5, death-rate 2.76, inoculated population 225 per thousand. In 1909, the typhoid-rate was 8.9, death-rate 1.58, inoculated population 613 per thousand, while in 1910 the typhoid-rate had fallen to 4.6, the death-rate to 0.63, while the protected population had been raised to 823 per thousand. Here the use of the inoculation must be given the credit for a reduction in five years of the typhoid-rates from about 15 to less than 5 per thousand, the death-rate from over 3 per thousand to 0.63 per thousand. Taking the year 1910, there occurred in a strength of about 70,000 men, 306 cases of typhoid, 155 in about 60,000 inoculated and 151 in about 10,000 who were unprotected. This gives a rate approximately six times as great for the uninoculated. Of those who contracted typhoid, 11.2 per cent. of those inoculated died, while the death-rate for those not inoculated was 16.1 per cent.

Very reliable data are available for the use of typhoid immunization in the German army in Southwest Africa during the Hereros campaign from 1904 to 1907. Though the results achieved were not as brilliant as those just quoted for the British army in India and for our own army to be spoken of later, they were, nevertheless, convincing of the value of the procedure; and any lack of success must be charged up to the earlier methods of preparing the vaccine. Of 16,496 men who participated in the campaign, 7,287 took the inoculation, which was voluntary. Among these men there occurred 1,277 cases of typhoid, the rates being 5.09 per cent. for those inoculated, and 9.84 per cent. for those uninoculated. Still more striking is the evidence shown by the differences in the death-rates; cases among the inoculated giving a death-rate of 6.47 per cent., while for those uninoculated the death-rate was 12.8 per cent. When it is considered that these figures are for nearly 1,300 cases of typhoid, all with the same surroundings, the value of the prophylactic inoculation in reducing the severity of the disease is apparently beyond question.

Nowhere, however, is there such convincing evidence for the practice of typhoid immunization as from the records of our own army. Up to the present time over 60,000 men have completed the inoculation, and among this entire number, and covering a period of nearly three years, but 12 cases of typhoid have developed and no death has occurred. One man at Guantanamo Naval Station died five days after the first inoculation from a case of walking typhoid. This is the only fatal case of typhoid in the government service in any one on whom the inoculation has been begun. The record of the Manœuvre Division in camp at San Antonio, Texas, during the past summer, has been most instructive. An army division having an average strength of 12,800 men, all inoculated,

occupied the same camp for four months, from March to July, and in this command but one case of typhoid developed. This was a mild case in a hospital corps man who had not completed the inoculations necessary for protection. Lieut.-Col. J. R. Kean, who has recently reported on this camp, is authority for the report of 49 cases of typhoid with 19 deaths for the city of San Antonio for the same four months. During the same period that this camp existed at San Antonio, between 3,000 and 4,000 men were in camp at Galveston, Texas, and in this command no case of typhoid occurred, while the city of Galveston furnished 192 cases of the disease during the existence of the camp. The city and the camp had the same water, milk and food-supply, the only difference being that the camp had been protected by inoculation.

About 3,000 men were scattered along the Mexican border mostly in small camps, many of them in localities where typhoid was present, but of this command only one man contracted typhoid, which ended in recovery. Contrast the record of these camps with those of the concentration camps of the Spanish-American war and consider the intimate contact of these camps with typhoid-infected cities. It is inconceivable that, with such conditions, the practical abolition of typhoid could have been effected without the use of the immunizing inoculations.

There are a few thoughts that suggest themselves here. First as to the paratyphoids. Clinically, these are not to be distinguished from the milder cases of true typhoid. Yet neither the degree nor the constancy of the group-reactions among the bacilli concerned would warrant us in believing that typhoid inoculations would be protective against the paratyphoid bacilli. Therefore, before we can obtain absolute data concerning the protection afforded by inoculation, it will be necessary to obtain the proportion of paratyphoid fever to true typhoid in the community, or by bacteriological examination to trace the organism concerned in every case of supposed typhoid among the inoculated. In the tropics it is likely that a fair proportion of the continued fevers are paratyphoids, and in such localities inoculation may prove comparatively disappointing. In any community where the proportion of paratyphoid infections is found to be high, the portion of paratyphoid vaccine might well be indicated.

The duration of immunity conferred by the inoculations is an important matter not yet settled. Firth, after a statistical study of the question on the British Colonial Army in India, places the period of protection after the first immunization at thirty months. Leishman thinks the reinoculation should be given after two years. In the United States Army the enlistment period is three years, and for the present the orders are that the inoculation shall be given at each enlistment. This is a point that only experience will clear up; and also as to whether, as in smallpox, the second inoculation will confer practically permanent immunity.

The treatment of typhoid by inoculations is still in the experimental stage. To show how unsettled this practice is, it need only be observed that the dosage given and recommended by different writers varies between 1,000,000 and 1,000,000,000 bacilli. No reports of large numbers of patients treated by individuals are yet available, but those to the number of thirty or forty have been reported by a few. The total number of cases in the literature will probably not exceed 400, but most of these have been closely observed by most competent men. The sum of the opinions of these men is unquestionably favorable.

Inoculation shortens the fever period and the total duration of the

disease; it reduces complications and relapses markedly; the mortality of all cases reported is 4.9 per cent. A distinct crisis, following the second inoculation, is reported by Meakins and Forster, of Montreal, to take place in 50 per cent. of their cases. It is interesting that these men gave the largest dosage of the vaccine—from 1,000,000,000 to 2,000,000,000 bacilli. Very pronounced amelioration of headache, gastro-intestinal symptoms and toxemia is usual. It has apparently been directly life-saving in a few, all but hopeless, cases, though ordinarily it has little effect on such. All agree, however, that even in the cases in which it causes no improvement, it has done no harm. The negative phase of Wright, which did so much to retard progress in typhoid immunization, is non-existent except in the most excessive dosage of the vaccine. In few cases reported was there any increase of temperature following the treatment, and in none was there any aggravation of the disease. The dosage employed in the earlier cases usually ran from 10,000,000 to 100,000,000. With increasing confidence the dosage has been increasing, until at the present time, it is usually from 100,000,000 to 500,000,000. It is probable that those who have reported negative or discouraging results have been using the vaccine in too small dosage, and that with increasing dosage, even better results than thus far reported will be obtained.

The conclusions to be drawn from all this evidence are of a definite character. The case for typhoid immunization, both in prevention of the disease and in decreasing case mortality, is a strong one. It is with reason that the Surgeon-General of the Army has given it as his opinion that the protection afforded by vaccination against typhoid would compare favorably with that against smallpox .

In treatment the vaccine has yet definitely to prove the extent of its worth, though it has the ray of hope of an agent which will reduce typhoid mortality below its hertofore irreducible minimum.

Fletcher described in detail the method of immunization used in our army. It consists in making three subcutaneous injections, at ten-day intervals, of a killed culture of *B. typhosus*. The vaccine was prepared in the laboratory of the Army Medical School at Washington, D. C., and is sent out in 1 c.cm., 5 c.cm. and 10 c.cm. sealed ampoules, the standard content being 1,000,000,000 dead bacilli per cubic centimetre. The first dose is 0.5 c.cm. and the second and third doses 1 c.cm. each.

The vaccination of an entire brigade would appear at first sight to be a rather stupendous task, and, as hypodermics are usually given, would indeed be such; but the method about to be described, which is the result of facing just such a proposition, has made possible the administration of over 4,000 doses without a single infected arm, with two officers working at the rate of 5 doses per minute.

The principal factors to be considered, then, since the vaccine is standardized and sterile, are the preparation of the subject's arm (experience having shown that the middle of the posterolateral aspect of the arm offers the most advantageous point), and the manipulation of the syringe and needle. Several syringes were tried with varying results. In general, it was clearly demonstrated that any syringe which depended on a rubber or leather washer for a tight connection between needle and barrel was sure to give trouble and to be short-lived. The best syringe is one with a plain, ground nipple on the barrel, to fit which the bases of the needles are ground. The needles will then stand repeated boiling and still make a tight joint. It has been suggested that simple plunging of

the needle into boiling water or strong solution of phenol or formalde-hyde solution is sufficient sterilization; but it is doubtful if the author of such a suggestion would relish being the next man inoculated with that needle after it had been used on a syphilitic. So, in view of the ques-tionable cases bound to appear, each needle was disconnected from the syringe and boiled, a freshly sterilized needle being used on each case.

Records of each case are kept on cards furnished by the Surgeon-General's office, and for this purpose a sergeant is stationed at a desk just within the door by which the men enter the vaccination-room. Coat-racks are provided in the hall. The men enter by organizations in as nearly alphabetical order as possible, each with his left arm bare, ex-posing the lower two-thirds of the arm. The necessary data are given to the sergeant as each man enters the "scrub-up" line. Here at the first table the arm is scrubbed with green soap and warm water, rinsed, and the subject passes on to the second table where a second man washes the previously scrubbed area with a 1 to 1,000 solution of mercuric chloride; he then advances to a third table where the field is rubbed with 95 per cent. alcohol, after which he comes to the officer who is to vaccinate him. This may seem like needless caution, but a glance at the water after a few arms have been washed would prove ample justification for the first step, while the fact that men coming from stables and police work of various kinds, without any preparation whatever, experience no bad re-sults, would indicate its thoroughness.

When the subject reaches the medical officer, the arm is grasped be-tween the thumb and forefinger of the left hand to steady it and pinch the skin taut, while the needle is plunged downward and slightly forward, nearly parallel with the surface of the arm, into the subcutaneous fat. The injection is given with moderate rapidity and the needle quickly withdrawn. The needle puncture is then touched with a glass rod mois-tened in pure tricresol, and the man leaves by another door. The tricresol dries in a few seconds after which the clothing may be replaced.

The use of tricresol in this manner has been very valuable, not only in cauterizing the needle tract, but the slight burn it leaves marks the site of a previous inoculation, and prevents the administration of two doses the same day; for, in spite of all directions, some men, knowing they must take three doses, will get back in line for another dose. Thus no difficulty is experienced, even with the short-lived memory of colored troopers; for tricresol leaves a white spot for several weeks, and it is impossible to mistake the number of doses received.

The cleaning-up process is conducted in a line, and may be as rapid as desirable; the greatest time being consumed in the filling of the syringe and the maintenance of surgical technique regarding the needles. As was stated before, each needle is boiled; and for this purpose a small evaporat-ing dish of water containing a little soda bicarbonate is kept boiling over a gasoline torch. An assistant picks up the needles from the table after they are used and drops them in the water to boil, after which they are removed with a sterile eight-inch Kelly clamp and placed point down in the needle holder. To secure a fresh needle, with the type of syringe de-scribed before, it is necessary for the surgeon only to insert the nipple of the syringe into the base of one of the needles in the holder, give it a slight twist and pull it out. It is well, after thus obtaining the needle, to set it firmly on the syringe by grasping the base (which is winged for the purpose) between the fingers and giving an additional twist. In this manner the inside of the base of the needle, its point and shaft, and

the outside of the nipple of the syringe can in no way become infected. The syringes are, of course, boiled to start with.

The needle-holder is steam-sterilized in a towel, or thoroughly flamed and placed on a sterile towel. Its capacity is such that two surgeons may have sterile needles available at all times and still allow at least one minute for boiling after use. It consists of a sheet of heavily tinned iron, so bent that it forms the bottom and sides of a box 10 in. long, 1½ in. wide and 2 in. deep. In the bottom are punched twelve holes about 3/16 in. in diameter, the burr directed inward. It is placed bottom up on the towel and thus furnishes twelve receptacles for needles large enough so that the point may be easily inserted, but too small to pass the base. The burr being directly downward makes the holes sloping enough on the edges so that needles do not catch.

The needle-holder, as before stated, is sterilized and the needles, as they are boiled, are removed from the water with the boiled clamp and dropped point down in the holes; the bases, projecting above the surface, are readily accessible without the necessity of handling. Sixteen needles will run two surgeons constantly; eight can be in the holder while four are boiling and four waiting to be boiled.

The vaccine ampoules are kept in a 1 to 500 mercuric chloride solution, removed and dried as needed, and, after shaking, scratched with a file and broken at the neck; the sterile needle is then inserted into the ampoule and the syringe filled. A little practice is necessary to hit the opening in the ampoule every time with a needle, and several needles will be soiled till this practice is acquired; but the use of the vaccine from the original container eliminates one source of infection, while the small opening minimizes dust contamination, which is a factor where so many persons are constantly moving.

By means of the foregoing equipment, two medical officers, assisted by four men, and one non-commissioned officer in charge of records, have been able to maintain an average of between four and five doses to the minute for an hour or more; and while it may seem elaborate and require considerable help, it is in reality a time-saver for both the subjects and the medical staff. At all events it has made the vaccination of from 150 to 300 men (a not unusual daily occurrence) a mere incident instead of a rather formidable task.

In view of the marked interest taken in antityphoid vaccination by civilians in the neighborhood of Fort D. A. Russell, it is safe to prophesy that the time is not far off when civil practitioners will be confronted with the problem of wholesale vaccination against typhoid in schools, etc.

It is hoped that the procedure may not fall into disrepute on account of infections due to the sacrifice of good technique for speed, and that the preceding paragraphs, in which the methods described apparently combine both technique and speed, may contain some useful suggestions.

Fletcher says that recovery from any infectious disease depends on two factors—the destruction of the causative organisms present in the body, and the elimination or neutralization of the toxins, produced by them. With this as a working basis, a typical case of typhoid fever in a non-immune may be considered from its onset to a favorable termination with reference to these two factors alone, ignoring the well-known pathological anatomy. Every non-immune or normal person must possess cell-receptors capable of combination with typhoid toxin, in order to present the typical symptoms of the disease. He must also possess either opsonin capable of actuating phagocytosis of the typhoid bacillus, or a

bacteriolysin or agglutinin capable of accomplishing its destruction. In other words, a man, who presents toxic symptoms as a result of typhoid infection, has killed enough bacilli to liberate their endotoxin. Let us follow this process.

Our subject secures a good dose of virulent typhoid bacilli. The first thing that happens is the destruction of a few of these organisms by the natural bacteriolytic forces, possessed by all individuals, with the liberation of their endotoxin. To this endotoxin the body reacts, producing a rise in temperature—very slight at first, because the dose of toxin liberated is small, on account of the feeble bacteriolytic power of the body. This toxin, besides causing a febrile reaction, excites the formation of a specific antibody to it and an antitoxin is produced, which, as it "fixes" the toxin present, causes a subsidence of the fever. If all the bacilli of the initial infection were killed in one lot, our case of typhoid would end here. Unfortunately this does not occur. The infecting dose of organisms being more than the feeble natural defenses of the body can handle, they multiply rapidly, and if, on the other hand, body defenses were exhausted with the killing of the first lot and not reproduced, their rapid increase would result in mechanically obstructing the circulation. Fortunately, however, this also does not occur; for besides the liberation of the endotoxin from within the cell-capsules of the destroyed bacilli, substances exciting the production of both agglutinin and bacteriolysin are also liberated, and the body is thus enabled to reproduce its antibacterial forces and attack the descendants of the unkilled bacilli of the initial infecting dose. The gradually rising temperature in the first week, then, may be said to be due to increasing doses of typhoid endotoxin liberated as the result of the destruction of increasing numbers of bacilli, by an ever-increasing bacteriolytic agent.

During the second week the condition reaches nearly a balance; that is, the production of antitoxin occurs nearly as rapidly as the toxin is liberated, but just enough later, or in insufficient quantity, so that the temperature remains practically uniformly high, on account of the abundance of bacteria from which the toxin is derived. During the third week, however, the bacteriolytic forces, which have constantly been added to, begin to assert themselves, and, either on account of their increased power, or a diminution in the virulence of the organism, the available supply of bacteria for the liberation of toxin diminishes. The doses of toxin then, after each bactericidal onslaught, are not so large nor so rapidly produced, in consequence of which antitoxic action becomes more apparent. A dose of toxin produces a febrile reaction, which disappears as the toxin is neutralized; the temperature rises and then falls before another dose of toxin is produced to repeat the reaction; a remittent temperature results in which the reactionary rises have a tendency to become progressively less pronounced and the periods of remission progressively longer. The temperature therefore falls by lysis.

It will thus be seen that, during the third week, bacterial aggressiveness may, figuratively speaking, be placed in one pan of a balance, and the body defenses, consisting of bacteriolysin, agglutinin and antitoxin, in the other, the remittent temperature registering the tilting of the balance-arm. The destruction of a group of bacilli and the liberation of their toxin are indicated by a rise in temperature, and the antitoxic action by a fall.

If the foregoing paragraphs may be considered as detailing the toxic-antitoxin strife as it occurs, it is obvious that the introduction of any

factor which would increase antitoxin formation would minimize the toxic symptoms of the disease; while the introduction of any factor which would increase bacteriolysis or agglutination would hasten its subsidence. Both these conditions are fulfilled when dead typhoid bacilli are introduced into the body, in that the endotoxin is supplied without the necessary destruction of bacilli by the body, and the antitoxin, the formation of which it excites, produced in excess of that needed to neutralize it, becomes available to act on toxin produced from bacteria killed within the body; also the bacteriolysins and agglutinins, whose formation causes the dead bacilli in the tissues.

That this does occur when antityphoid vaccine is used prophylactically is experimentally proved; and that the use of bacterial vaccine in clinical typhoid will start a prevailing tilt of the balance in favor of recovery, Fletcher cannot help but believe from the observation of several cases. In fact, as the cases herewith reported show, the duration of fever in the majority was below the average, while the average in all cases was materially reduced. In no case in which vaccine was administered did untoward symptoms follow, aside from the expected reactionary temperature rise; and, even in cases not showing a decided result, the patients professed to feel stronger and better, and even asked that the dose be repeated.

A brief outline of 14 cases of typhoid occurring in 1910, in which the vaccine was used therapeutically in doses of 500,000,000 to 1,000,000,000, is given in detail.

In these cases the diagnosis was based on the Widal reaction, the macroscopic method being used and the end titre of each patient's serum being obtained. Besides the Widal reaction, total leucocyte counts and differential counts were made on the same day as the Widal.

In no case was actual or polymorphonuclear leucocytosis present. The feces of each was plated on Endo's medium; all suspicious colonies were fished and planted in lactose-litmus agar. From these tubes, showing a characteristic reaction, the organism was transferred to plain agar; and, as a plain agar culture, was agglutinated by a known typhoid immune serum.

It was noticed distinctly that the cases which gave the lowest serum titre in the Widal reaction were those in which the symptoms were most aggravated. On the other hand, the cases which gave an agglutination in a dilution of from 1,360 to 1,720 on the tenth day, ran a mild, short course. With the exception of 3 of the cases cited, and 5 ambulant cases which have not been reported, the degree of prostration and toxemia manifested by these patients within ten days of their admission was the most pronounced witnessed in several typhoid epidemics. The contrast following a single inoculation was consequently most remarkable. In 3 cases the result was most startling. The entire picture was changed in forty-eight hours from that of a patient in serious condition to that of one whose course was more favorable.

Fletcher concluded that the therapeutic administration of antityphoid vaccine was attended with no bad results, and does in no way increase the patient's discomfort. On the other hand, its use did, in all the cases observed, improve the general condition of the patient; while in the 3 cases just referred to, its action was nothing short of marvelous. In view of these facts, and granting the correctness of the hypothesis advanced, it would seem that vaccine in typhoid fever was certainly indicated.

Semple, in an exhaustive review of this subject, reports on 516 cases given vaccine treatment. He says when the specific virus has been swallowed, and has gained a portal of entrance by establishing itself in the lymphatic tissue of some part of the intestinal tract, multiplication takes place, and it soon finds its way to other parts of the body, such as the mesenteric lymphatic glands, spleen, etc. From these foci it finds its way into the blood-stream, and through the medium of the blood is lodged in the liver, kidneys, spleen and bone-marrow, where fresh foci of multiplication are formed. From all these foci (and possibly others) the virus is constantly being fed into the blood, where it is gradually killed off, with the result that a liberation of typhoid endotoxins takes place in the blood. The toxic condition observed in typhoid-fever cases is due to the presence of typhoid endotoxin in the circulating blood.

During the early period of the disease there is a gradual rise of temperature for a number of days, varying from five or six up to ten or thereabouts, which is doubtless due to liberation of typhoid endotoxin in the blood-stream. Then comes a period during which the temperature remains more or less stationary, and as a rule during this period we can obtain evidence of bacteriotropic elements in the blood.

It will thus be seen that at the very outset of its course, typhoid fever is an infection in which the micro-organisms cultivate themselves in certain tissues, and that shortly after this stage the disease drifts into a bacteremia. We have no evidence that typhoid bacilli multiply in the blood-stream. On the contrary, all the evidence we possess points to a multiplication in the tissues referred to, and to a destruction in the blood-stream as they are gradually fed into it. It will be seen that this condition of affairs is somewhat different from a true septicemia, where the micro-organisms cultivate themselves in the blood-stream.

There are a few other facts which should be taken into consideration, viz., that the recovery from any bacterial disease, as Wright has pointed out in his studies on immunization, depends on the production of protective substances in the organism; that no one acquired protection against a disease except by the production of protective substances; and that no one can live in the presence of infection except by the aid of protective elements in his blood.

In the light of these facts, a diminution of the antibacterial substances in the blood would mean an increase in the infecting micro-organisms; and, on the other hand, an increase in the antibacterial substances would mean a decrease of infection. The temperature curve only means intoxication, and is in no way a measure of immunization. The chain of events in a bacterial infection, as Wright has pointed out, would be somewhat as follows: "An increase in the antibacterial potency of the blood leads as a rule to restriction of microbial growth in the organism, this to a diminished intoxication, and this, in its turn, to a reduction in temperature." But while it is the rule to find this inverse relation of temperature to antibacterial potency, it is certainly not the invariable rule. An excessive intoxicaton may condition a fall in the temperature, and it is conceivable that the rise of temperature may sometimes be directly associated with a sufficient immunizing response.

The appearance of protective elements in the blood of a typhoid patient is the result of Nature's effort to get the upper hand of the infection. This natural response which takes place when a prophylactic inoculation is carried out, viz., an increase in the agglutinating power of the serum, an increase in the bactericidal substances, together with an increase in

opsonins, and possibly also several other changes as yet uninvestigated. Finally, the observations of Wright and Lamb on the distribution of the agglutinins in the organism in the case of typhoid and Malta fever, and the more recent observations of Wright on the diminution of bacteriotropic substances in the sites of local infection, would indicate that in typhoid fever the infecting microbes are cultivating themselves in regions where the bacteriotropic pressure is lower than in the general bloodstream—a condition of affairs somewhat resembling localized bacterial infection.

With the aid of these facts, together with a knowledge of what takes place during an immunization process, and the methods employed for measuring the amount of antibacterial substances in the blood, we are in a position to say what progress a typhoid fever patient is making in his efforts to free himself from infection. Let us see how these facts can be practically utilized in the treatment of typhoid fever by means of vaccines, and what we are to expect from such treatment. The possibility of being able to lower the death-rate and diminish the chances of relapse are a sufficient plea to entitle this method to receive a careful consideration.

The first question that confronts us when recommending the use of vaccines during an attack of typhoid fever is the question whether it is likely to increase the toxic condition of the patient. At first sight there would seem to be ground for some apprehension on this point; but, when the subject is carefully examined, it will be seen that this objection does not hold good.

In the disease itself the toxic condition is produced by the substances in the bacterial protoplasm (or endotoxins), as these substances are liberated from the broken-up or lysolized typhoid bacilli which are being fed into the blood-stream from the foci of infection.

When dead typhoid bacilli (or vaccines) are injected into the tissues, it is the products of the metabolism of the bacteria which act; and these products are the results of the action of the tissues at the seat of injection. Here we get a localized toxic effect on the tissues, and a consequent local production of bacteriotropic substances, which find their way into the blood. On the other hand, when, as during an attack of typhoid fever, the bacteria are broken up in the blood-stream, the liberated toxin is diluted by the whole volume of the blood, and served out to the tissues in such a diluted form as only tardily to give rise to an immunizing response. In such a condtion we get the full toxic effect, but only a slow immunizing effect, and although immunity does eventually come about, this is not the quickest way to obtain it.

If it is accepted that bacteriotropic substances are elaborated locally at the site of injection of bacterial vaccines, it follows, as Wright has pointed out, that the toxic substances in the vaccines are held back in the tissues where they are injected. If this is the case, vaccines injected into the tissues must give rise to less intoxication than a similar amount injected into the blood-stream. Their efficiency does not depend on their toxic effects, but on the reaction they set up in the tissues, and the consequent production of bacteriotropic substances. By this means it is possible, as Wright has put it, "to exploit in the interest of the infected tissues the unexercised immunizing capacities of the uninfected tissues."

Russell, in his explanation of how typhoid vaccine is beneficial in typhoid fever, adheres to the views put forward by Wright. He holds that "the subcutaneous tissue produces antibodies freely, and that, as

it is not ordinarily involved in typhoid fever, subcutaneous injections of vaccines in this disease do good by throwing this unused centre into action." Wassermann and Citron, as the result of their experiments on rabbits with dead typhoid bacilli injected subcutaneously, have also arrived at this conclusion.

The local elaboration of antibodies as the result of the subcutaneous injection of antigens is not universally accepted. Hektoen has recently carried out experiments in dogs, from which he concludes, "that the tissues at the site of injection of antigen do not take any measurable part in the production of antibodies." In one series of his experiments in which he used goat's blood as an antigen, he injected five dogs, each in the lower part of the right foreleg; two days later the right foreleg was amputated in two of the dogs, and the left in two, but nothing was done to modify or disturb the formation of antibodies in the fifth dog. There was no striking or definite difference in the amount of specific lysin for goat's corpuscles in the blood of these five dogs. Possibly in these experiments the products of the metabolism of the antigen used had given rise to the formation of antibodies before the injected tissues had been removed.

Whether we accept any of the foregoing explanations or not, we cannot get away from the fact that the vaccines, in quantities sufficient to stimulate an increased production of bacteriotropic substances, can be injected hypodermically into patients suffering from typhoid fever without adding in the least to their toxic condition. This, in a few words, is the crux of the whole question.

This method of treating typhoid fever may be said to date from 1893, when Fraenkel first applied it. Very little was heard of it at the time, and the method fell into abeyance until a few years ago, when the application of vaccine therapy in various directions, as the result of Wright's investigations, came upon the scene. Since then a number of investigators have given it a trial, and recorded their experiences.

Chantemesse, between the years of 1901-1907, prepared an antityphoid serum by immunizing horses for prolonged periods with a toxin obtained from a virulent strain of typhoid bacilli, grown on a special medium, prepared from an extract of spleen digested with pepsin, and subsequently neutralized. He injected his patients subcutaneously in the arm with one, and sometimes with two doses of the serum, using only a few drops for each dose. He recorded 1,000 cases treated in this way between 1901-1907, with 4.3 per cent. of deaths. His serum was also used by three other physicians in Paris to treat 290 cases, and the death-rate in this series was 4.16 per cent.

The mortality in other cases not treated by the serum varies from 10 to 12 per cent. Chantemesse attributes these good results to an increase in opsonins, and phagocytosis. It is now generally accepted that Chantemesse's serum acts rather as a typhoid vaccine, owing to the probability that it contains the bacterial elements originally injected into the horses which supplied the serum. Whether this is the explanation or not, the results appear to be very good.

On glancing over the scattered literature recording cases of typhoid fever treated by means of vaccines, the largest collected figures which Russell found were those given by Stoner and Callison. The former refers to 169 cases, and the latter to 214. These figures, together with a few others recorded by other observers, will serve to show whether the vaccines used have had any effect in lowering the death-rate and in

diminishing relapses, which after all are two of the most important points to be taken into consideration in assigning this method of treatment a position in therapeutics. Stoner's and Callison's collected figures include most of the cases published by English and American observers up to the early part of 1911. In the 169 cases referred to by Stoner, there were 5 deaths and 5 relapses, which gives a death-rate of 3 per cent. and the same percentage of relapses. In the 214 cases referred to by Callison there were 10 deaths (excluding 2 who were hopeless and dying when treatment was undertaken) and 11 relapses. This gives a death-rate of 4.6 per cent. and relapses 5.1 per cent. On examining the reports of these two observers, it is evident that Callison included in his figures at least 117 of the cases referred to by Stoner. On eliminating these 117 cases (in which there were 3 deaths and 3 relapses) and adding on the remaining 97 to Stoner's figures, we get 266 cases, with 12 deaths and 11 relapses, which gives a death-rate of 4.5 per cent., and relapses 4.1 per cent.

Callison, as the result of his experience, is of the opinion that vaccine treatment reduces the death-rate, diminishes the relapses, lessens complications and probably shortens the attack in some cases. He recommends vaccine therapy for every case of typhoid fever to be commenced as soon as a diagnosis has been arrived at, and to be continued until the temperature becomes normal, or until it has been demonstrated that the case would not respond to this form of therapy. He prefers stock vaccines to autogenous vaccines, and the older the culture the better it is. In no instance did he notice any injurious effect as the result of the vaccine, and it did not interfere with other treatment.

Treatment was commenced at various stages of the disease, some at an early date, and some during the fourth and fifth week, but no perceptible difference in response to the treatment was observed. At first he used small doses of 25,000,000 bacilli, but later he increased his doses to 300,000,000. In judging of the effects of a vaccine he takes the opsonins and agglutinins as a measure of the antibodies present. Finally, he believes that a negative phase after a curative vaccine (if it occurs at all) is a negligible quantity.

Hollis treated 50 cases, with 2 deaths. In one of the cases, death occurred thirty-six hours after admission, and the other after five days. Both were in an extremely bad condition when treatment was instituted. He noticed no bad effect from the vaccine treatment and the typhoid state was rare. He recommends doses of 50,000,000 bacilli every other day to commence with, and then gradually to increase up to 500,000,000, but not to go beyond this dose.

Watters and Eaton refer to 36 cases who received regular vaccine treatment in addition to routine treatment, and 71 cases who received routine treatment and no vaccines. In the 36 cases treated with vaccines the average duration of the fever was 15.5 days; average residence in hospitals 39 days; and relapses 8.3 per cent. In the 71 cases not treated with vaccines the average duration of the fever was 25.3 days; average residence in hospital 57 days; and relapses 25 per cent. They state that not only are vaccines innocuous when properly used, but that their use confers distinct benefit on the patient, reducing the mortality, shortening the duration of the disease, and rendering the relapse less liable. No aggravation or injury of any kind was demonstrable as the result of the inoculation. They also state that the more serious the clinical condition of the patient, the smaller should be the dose employed. In one instance,

in which the case was all but hopeless, daily doses of 2,000,000 were followed by gradual change for the better in the clinical symptoms.

Meakins and Forster treated 41 cases with stock vaccines, but they consider that autogenous vaccines would have been an improvement. The death-rate was 2.4 per cent. in those vaccinated, as compared with 13 per cent. in those not vaccinated. Relapses occurred in 2.4 per cent. of the vaccinated as compared with 10 per cent. in those not vaccinated; complications occurred in 5 per cent. of the vaccinated and in 42 per cent. of those not vaccinated. They used very large doses, viz., 1,000,000,000 as a first dose, 1,500,000,000 as a second dose, and 2,000,000,000 as a third dose. The average interval between the inoculations was eight days. In no case was there any exacerbation of the typhoid sysmptoms, but on the contrary a distinct improvement was noticed after twenty-four hours, either in the condition of the patient, or in the temperature chart, or less than in those not treated with vaccines. They are of the opinion that the vaccine has a marked beneficial effect on the toxic symptoms in almost every case.

Wilson records 6 cases treated by means of stock vaccines. In all he noticed a beneficial effect. Treatment was commenced early and the disease ran a mild course. All recovered and there were no relapses. The doses he used varied from 250,000,000 to 500,000,000 bacilli given at intervals of a few days.

Smallman treated 36 cases by means of vaccines. In his earlier cases he used an initial dose of 100,000,000 bacilli, and after an interval of nine to ten days a second dose of the same amount. In his later cases he gradually increased the dose and diminished the intervals, giving doses of 300,000,000 to 350,000,000, and with better results. He had 3 deaths, or 8.3 per cent.; but 2 of the deaths were fulminating cases who died a week after admission, and had received only one dose of vaccine. He noticed a beneficial effect of the vaccine in all his cases. The modifications in the disease were apparent in the temperature, appearance of the patients, increased amount of urine, low mortality, and general effects, such as absence of complications, sequelæ, relapses, and a certain amount of shortening of the fever. He also mentions that an injection of vaccine into a local infection (commencing periostitis of tibia) due to the typhoid bacillus in one of his cases had the effect of shortening the threatened lesion. No bad results due to the use of the vaccine were observed. He regrets that time did not allow of any observations on the blood of those treated; but he is of the opinion that the temperature chart would serve as a useful guide, a fall of temperature being a good symptom, and one to be expected soon after a dose even though it be preceded by a preliminary rise.

Smallman is distinctly in favor of this method of treatment for typhoid fever, and believes that by continuing the treatment into the period of convalescence the number of relapses could be reduced.

Leighman believes that this system shows considerable promise for good, and hopes that it may be given a more extended trial. He thinks that the results of estimation of the protective substances in the blood of those treated would enable us to judge as to whether the theoretical basis of the method is well founded.

Allen records a most interesting case where the patient had two relapses, and then developed a pneumonic condition of the lung a week prior to seeing him. The sputum and blood, when cultured, yielded bacillus typhosus. When a typhoid vaccine had just been prepared, the

patient got a third relapse, the temperature rose to 105°-106° F., and a pneumonic condition due to the typhoid bacillus appeared in both lungs. A dose of 50,000,000 bacilli was at once given, when the temperature soon began to fall, and was subnormal within twenty-four hours, and the patient made a good recovery. Only the one dose of vaccine was given. The case is interesting as an example of "typhoidal pneumonia," which rapidly responded to vaccine treatment.

Semple's experience dates from 1907, when he treated 9 cases with no deaths and no relapses, and published the details of these cases in the *Lancet*. Since then he has treated 21 more cases, and has supplied the vaccine and given directions for the treatment of 30 other cases; so that altogether he could refer to 60 cases treated under his directions by means of vaccines. In these 60 cases there were 2 deaths and 2 relapses, giving 3.3 per cent. of deaths and the same percentage of relapses. With a few exceptions the course of the temperature was lowered, but not cut short to any appreciable extent, and in none of them did complications or sequelæ give rise to any trouble. In 3 of the cases there was no apparent improvement, but in one of these cases it was found that the patient was suffering from a mixed infection, as *B. typhosus* was isolated from the blood early in the disease, and *B. paratyphosus A* from the urine and feces when convalescence was setting in. The patient made no marked response to treatment with an autogenous typhoid vaccine; but, had a mixed infection been diagnosed earlier and a paratyphoid A vaccine been used in addition to the typhoid vaccine, it is possible that the response might have been more marked. As it was, the patient made a good recovery.

The diagnosis in the majority of these 60 cases was made by blood-cultures, and in the remainder by Widal's test. In 15 cases of the series (including 9 reported by him in the *Lancet*, June 12th, 1909) the blood changes were followed throughout the disease, and in every instance there was evidence of an increase of protective substances in the blood. The opsonins were invariably increased, and the increase was apparent within a day or two at most after the first dose of vaccine. In no single instance could any lowering of opsonins be detected after the doses given, and in none of them was there any evidence of a negative phase.

In 2 cases not treated with vaccine, whose blood was tested for opsonins during the course of the disease, the opsonic index remained at a lower level than those receiving vaccine treatment (*Lancet*, June 12th, 1911, pp. 1674-1675). One of these cases died, and two days before death the opsonic content of his blood was negative, *i. e.*, less than that of a normal person.

In this connection Semple mentions that the opsonins in a typhoid fever patient's blood may vary from day to day irrespective of vaccine treatment. A low opsonic index would indicate that the patient was doing badly, and it would also indicate that a patient receiving vaccine was not responding to the treatment. He had not yet noted any lowering of the opsonic index in those receiving vaccines, although he had many times detected it in those not receiving vaccine treatment, and who were not doing well.

The doses given varied from 6,000,000 to 50,000,000 bacilli in his earlier cases, and from 50,000,000 to 80,000,000 and 100,000,000 in those treated later. In the light of recent experience in the use of the vaccine, he would now recommend 100,000,000 bacilli at least to begin with, and

gradually increase up to 200,000,000 and 300,000,000. In most of the cases from four to six doses were given. In some of them the vaccine was given daily, and in others every second day. Whether a dose was given daily or every second day depended on the response of the patient to the vaccine. In some of the cases improvement was noticed within twenty-four hours after the first dose, but in others improvement was not so early, and in these cases an interval of forty-eight hours was allowed to elapse before giving a second dose. Four were treated with autogenous vaccines, and 3 of these did extremely well, and the fever ran a short course; but the fourth case, which was a mixed infection, viz., *B. typhosus* and *B. paratyphosus A*, did not respond in a satisfactory manner, probably owing to the fact that a typhoid vaccine only was used, the paratyphoid A infection not being diagnosed until convalescence set in.

In his opinion, the benefits a patient derives from the vaccines correspond on the whole with the opinions of the observers already referred to in this report, and whose results have already been given.

The following table shows the death-rate and relapses in the cases to which reference has been made:—

Authority.	Number of cases.	Number of deaths.	Number of relapses.	Percentage of deaths.	Percentage of relapses.	References.
Stoner......	169	5	5	3	3	*American Journal of the Medical Sciences*, February, 1911.
Callison....	214	10, excluding 2 who were hopeless when treatment was commenced.	11	4.6	5.1	*New York Medical Journal*, July 11th, 1908.
Hollis......	50	2; both were in an extremely bad condition when admitted.	—	4	—	Ditto.
Watters and Eaton	36	—	3	—	8.3	*Medical Record, New York*, May 6th, 1911.
Meakins and Forster	41	1	1	2.4	2.4	*Canadian Medical Journal*, June, 1911.
Wilson	6	—	—	—	--	*Royal Army Medical Corps Journal*, August, 1910.
Smallman..	36	3; two were severe cases, and died a week after admission, having received only one dose of vaccine.	—	8.3	—	*Ibid.*, vol. xii., p. 136.
Semple.....	60	2	2	3.3	3.3	—

Callison's 214 cases probably include 117 (or possibly more) of the cases referred to by Stoner; and both Stoner's and Callison's figures in-

clude Smallman's 36 cases and the 9 cases published by Semple. They may also include most of the other cases referred to in this table, so that a more correct idea is conveyed by taking the figures of each observer separately.

The figures he has given, although small, are certainly encouraging, and justify the opinion that the vaccine system of treatment shows considerable promise. The number of cases treated are, however, still too few to be relied upon to give a just account of the success of this method of treatment. A more extensive trial is necessary before we can say for certain whether vaccine therapy, in the hands of those who are in a position to carry it out to the best advantage, will invariably give better results than any other method of treatment, as judged by fewer deaths, fewer relapses, and less complications. The results, up to the present, point in the direction of leading us to expect that it will have this effect.

As regards the vaccines, choice is limited to stock vaccines or autogenous vaccines. The busy practitioner would doubtless prefer to use stock vaccines, and from what he has already said it would appear that some of the American observers also prefer stock vaccines and old cultures. It is not always easy or convenient to prepare an autogenous vaccine, but when it can be done, and without unnecessary delay, it would be advisable to prepare a vaccine from the patient's own infecting microorganism. The advantages of an early and an exact differential diagnosis by means of blood-cultures are now beginning to be appreciated more and more every year. Many physicians now diagnose their suspected cases of typhoid fever by culturing direct from the patient's blood. This has the great advantage of enabling us to arrive at a correct diagnosis early in the disease, and it has also the equally great advantage of enabling us to say whether the infection is due to the $B.$ $typhosus$ or to one of the paratyphoid group. It would also prevent us from dropping into the error of using a typhoid vaccine for a paratyphoid infection, except possibly in those rare cases where there is a double infection due to $B.$ $typhosus$ and one of the paratyphoid group. Once a culture of the causal organism is obtained by this method, there should be no difficulty in having a vaccine prepared by the next day, or within forty-eight hours at the latest, especially in hospitals and other institutions where the bacterial diagnosis of disease is carried out as a routine measure. In the meantime, while an autogenous vaccine is being prepared, it would be advisable not to waste time, but to commence treatment with a stock vaccine; and should any hitch or delay occur in the preparation of an autogenous vaccine, the treatment could well be carried out with stock vaccines. Semple mentions that for some years it has been his practice to sterilize typhoid and other vaccines by the addition of 0.5 per cent. carbolic acid, without heating. He found that the immunizing and keeping properties of vaccines are more reliable when heat is omitted.

$Dosage.$—Unfortunately there is still some divergence of opinion as to what is a proper dose with which to commence treatment. In his first cases Semple commenced treatment by giving 6,000,000 bacilli, and gradually increased the dose to 50,000,000; but later on he commenced by giving 50,000,000, and gradually increased up to 100,000,000. He has no hesitation at present in commencing with 100,000,000, and gradually increasing up to 200,000,000 and 300,000,000, but he would take very good care to satisfy himself as to what effect the first dose had on the patient before giving a second dose. The object would be to increase the protective substances in the blood, and to accomplish this in as short a

time as possible, without adding to the toxic condition of the patient.

He thought it would be a great mistake for the physician blindly to follow any routine rule or rules laying down the dosage of a vaccine for patients suffering from typhoid fever. The differences in the various strains of typhoid bacilli used for vaccines, and the differences in the immunizing response of different patients to one and the same dose of any particular vaccine, together with the possibility of a difference in the response of the very severe cases as compared with the less severe cases, should be taken into account. What the physician does require may be summed up in a few sentences, viz., a knowledge of bacteriology and the leading facts connected with immunization; a knowledge of the blood changes which take place during bacterial infections and as the result of the injection of bacterial vaccines; and, finally, a practical knowledge of the methods employed in measuring the amount of protective substances in the blood.

Armed with this knowledge the physician would be in a position to set up a standard of his own to guide him in dosing his patients with vaccines, and all the instructions he would require before carrying out vaccine therapy in a case of typhoid fever could well be written on the label of the bottle, and might take the following form: Typhoid vaccine—so many millions per c.cm.; date of preparation. His own knowledge should supply all the rest. An increase in dosage would altogether depend on how the patient responded to the earlier doses, and in judging of this response we should be guided by the blood changes and clinical symptoms. Both factors should be considered. An increase in the bactericidal power of the serum, an increase in the opsonins, and possibly also an increase in agglutinins, would indicate that the vaccine was helping on what Nature was trying to accomplish.

An occasional blood test would be sufficient for all practical purposes, for after all it is an improvement in the clinical condition of the patient at which one aims. As long as the patient was deriving benefit from the vaccine there would be no object in limiting the treatment to a few doses. A continuation of the treatment up to the stage of convalescence would, according to some observers, have more effect in preventing relapses, and it might also have some effect in preventing patients becoming "bacillus carriers."

Interspacing of Doses.—Up to the present no two observers have followed the same routine. Some of the cases did well on daily doses, and others did equally well when the vaccine was given every second day. Those who treat with large doses to begin with, leave a longer interval before repeating the dose. It would appear from the cases recorded that there is not much difference in the results obtained by a few large doses, as compared with the results obtained by a larger number of smaller doses. Semple is inclined to follow the method of giving medium doses, say 100,000,000 bacilli to begin with, and gradually increasing up to 200,000,000 to 300,000,000, and leaving an interval of from twenty-four to forty-eight hours between each dose. An increase in the doses mentioned would indicate a longer interval; and, on the other hand, a decrease would indicate an interval of possibly only twenty-four hours. Here, again, a blind routine might lead the physician astray, and to prevent this it would be advisable to consider each case on its merits, and to be guided by the blood changes and clinical symptoms. An interspacing of doses which maintains a high bacteriotropic pressure in the blood is the ideal to aim at.

Site of injection.—Here there was choice between the intramuscular and subcutaneous methods of administering vaccines. As pointed out elsewhere the immunizing response of typhoid vaccine in animals is the same whether the vaccines are given subcutaneously or into the muscles. An intramuscular injection causes a little more pain than a subcutaneous injection, and knowing that it possesses no advantage over a subcutaneous injection as far as bacterial vaccines are concerned, it is best to have recourse to the latter method. The front of the chest, about 4 to 5 in. below the middle of the clavicle, is the most suitable site to give typhoid vaccines subcutaneously. It is easy of access, gives rise to no inconvenience when the patient moves in bed, and it is very easy to make sure that the needle enters only the subcutaneous tissue in this part of the body. The flank or sides of the abdomen are also good situations, but when given in these regions the patient is inconvenienced to a certain extent from local pain on movement. Others prefer the arm, but from an immunizing point of view there is little to choose between either of these situations. The upper part of the chest would inconvenience the patient least of all, and this is a factor which has often to be taken into account. No two injections should be given into the same spot. The selection of a fresh site for each inoculation would not overtax the tissues at the seat of injection, and would give rise to a larger output of protective substances.

In conclusion he would like to emphasize the fact that the administration of vaccines to a patient, suffering from typhoid fever, does not interfere with any other treatment the physician may deem necessary. It simply aims at keeping on what Nature is trying to accomplish. The counteraction of any untoward symptoms by means of the usual time-honored remedies would also help in the same direction, and would at the same time place the patient in a better position to benefit from vaccine treatment. Semple's general conclusions are as follow. (1) The treatment of typhoid fever by means of vaccines rests on a sound theoretical basis, as proved by the increase of protective substances in the blood of patients undergoing treatment. (2) If any reliance can be placed upon a limited collection of figures, vaccine-therapy treatment is a practical method by which we can lower the death-rate, diminish relapses, and lessen complications in typhoid fever. (3) The treatment is devoid of all risks, and can be easily carried out, and to the best advantage by any physician with a knowledge of bacteriology, and the leading facts connected with immunization; a knowledge of the blood changes which take place during bacterial infections, and as the result of the injections of bacterial vaccines; and, finally, a knowledge of the methods employed in measuring the protective substances in the blood. (4) The results already achieved indicate that it is a method of treatment worthy of the serious attention of those who are called upon to treat typhoid fever.

Sadler reported the account of the first 50 cases of typhoid fever with typhoid vaccine, in 1910, in the January number of the *Quarterly Journal of Medicine*, with charts, and the experiences which led to his present position and practice. In 1911, he had the opportunity of treating with vaccine 40 more cases, while during his holiday 17 cases were left untreated with vaccine as a control. In 2 of these 17 cases he felt obligatory on his return to use vaccine, because he became anxious lest the want of progress should result fatally. Of the 15 other cases in

which vaccine had not been used, 3 had already died, 2 during his absence, and 1 after his return. The case-fatality of the 17 control cases was already 17.6 per cent. or 2 per cent. higher than the average case-fatality of 979 cases treated in the Kendray Hospital during the preceding ten years, and it was evident that the type of disease was no milder than in previous years; therefore, he injected vaccine in these 2 cases. Progress in the right direction certainly followed the use of vaccine, but it was difficult to classify these 2 cases. If they are taken out of the control category, the case-fatality of the control becomes 20 per cent., which may be considered to make the control unfairly unsatisfactory, while if they were left in the control category, the control contains 2 cases which were not left to the ordinary treatment.

He enters into detail about these control containing these 2 cases, because vaccine treatment of typhoid fever must stand or fall by its case-fatality. Of the 40 cases treated with vaccine, 5 died. Three of these deaths were hemorrhage cases. One was a child who received vaccine which was prepared more than six months prior to use, and one was a man, admitted on the thirty-fifth day of the disease, who came into the hospital in a dying condition, and who died two days after admission. The case-fatality of the vaccine cases, therefore, does not exceed 12.5 per cent.

The Kendray Hospital.—The Kendray Hospital, Barnsley, is an isolation hospital serving the Barnsley Poor Law Union, whose population at the census of 1911 was 141,000. The hospital has four separate pavilions and 110 beds, and the average of typhoid cases admitted is 97.9 per cent. per annum.

Class of Patient.—The typhoid cases are men, women and children from Barnsley and the surrounding colliery villages, in which typhoid fever is more or less endemic. A certain small proportion of the Barnsley cases are from among the very poor, but the majority of the cases are from the coal-miner class who can earn from 25s. to 45s. a week. About 5 to 10 per cent. of the cases are sent in to the hospital when it has become hopeless to continue nursing them at home. Another 5 to 10 per cent. are sent to the hospital at the end of the first week of the disease. The great majority of the cases arrive between the twelfth and fifteenth day of the disease. The case-fatality of the typhoid cases nursed in the Kendray Hospital varies from 9.2 to 21.5 per cent. as shown in the following table. The comment on the 1910 figures compresses into a few lines the results of the vaccine treatment of 1910.

TYPHOID FEVER IN KENDRAY HOSPITAL.

Year.	Cases Admitted.	Deaths.	Case-fatality per cent.
1901	119	19	15.9
1902	65	14	21.5
1903	101	20	19.9
1904	91	13	14.2
1905	98	9	9.2
1906	94	11	11.7
1907	87	16	18.4
1908	146	21	14.3
1909	123	21	17.0
1910	55	10	18.0
Totals	979	154	15.6

Considering the 55 cases in 1910, of which 50 were treated with vaccine, in 5 of the 10 cases which died it was clear from the first that the new antigen treatment could be of no avail. In one of the remaining fatal cases the antigen treatment was not, as a matter of fact, used. There remain 4 fatal cases in which, after giving promise of better things, the antigen treatment failed to save life. On the other hand, the influence of the new antigen treatment in shortening the period of disease and improving the condition of the patient (in one case quite definitely saving life) was most satisfactory.

Vaccine.—The vaccine that he used contains 4,000,000 killed typhoid bacilli per cubic centimetre. It is prepared from the stock cultures of the Sheffield University Laboratories. These cultures are kept sufficiently virulent to give satisfactory results in Widal's reaction. He had so far made no attempt to obtain specially virulent strains of bacilli, because he thought that one of the desiderata of a vaccine is that it should be easily obtained. Typhoid bacilli, virulent enough for Widal's reaction, are available at all bacteriological laboratories, and this standard of virulence seems to be now easily maintained.

Sadler believed it advisable to get a fresh stock of vaccine every five months. In the sixth month he was sure new vaccine was more efficacious than the old. For hospital use he found it most convenient to keep the stock vaccine in a flask, and from time to time he put sufficient for current purposes into a small wide-mouthed glass jar, which he covered with india-rubber from an operating glove, fastening the cover to the neck of the bottle with india-rubber bands. Some hard paraffin is melted and poured in a thin layer on to the top of the india-rubber and through this a long needle attached to a glass syringe, graduated in .02 c.cm., is pushed when the vaccine is wanted for use. A red-hot sewing needle seals the puncture by re-melting the paraffin. A glass cover like that of a spirit lamp protects the paraffin from crude dust. The needle for withdrawing vaccine is not used in making the injections, a smaller needle being substituted. The usual aseptic precautions are taken.

Initial Dose.—The initial dose used for patients over seventeen years of age is 2,000,000 killed bacilli. In mild cases, during the first ten days of the disease, 4,000,000 seem to do no harm; but he had seen harm done by 4,000,000 at later stages, though when the exacerbation of the illness passed off one of the patients rapidly became convalescent. Therefore, to be on the safe side, he did not give more than 2,000,000 to start with. A smaller initial dose should be given:—

(1) In cases with serious cerebral symptoms, whatever the stage of the disease, he started with 1,000,000 bacilli.

(2) After the seventeenth day of the disease, if there was continuous high temperature (102.5° F. or over), he also started with 1,000,000 bacilli, or less if the patient was in bad condition.

(3) To patients under seventeen years his practice is to use as maximum dose, at five years, 500,000, at ten years, 1,000,000, at fifteen years, 1,500,000.

Subsequent Doses and Spacing.—Whatever the initial dose, the second dose should be half the quantity, and given five days later, *i. e.,* after four clear days' interval. He had tried three-day and five-day intervals and was satisfied that the results are not so good as with the four-day interval. The third and subsequent doses, he thought might be the same as the second, and he continued to inject till the

tenth day of normal temperature. This did not prevent relapses, but removed the fear of anaphylaxis should a relapse occur and further injections be required.

Contraindications.—No injection of vaccine should be made within twenty-four hours of hemorrhage from the bowel. Three cases in which severe hemorrhage followed such injection led Sadler to formulate this rule for his own guidance. If perforation is suspected vaccine should not be given. Chantemesse suggests nucleinate of soda. The milder the case, and the earlier vaccine is used, the more satisfactory are the results. Subject to the two contraindications, vaccine treatment is well worth trying. No improvement is to be expected after the initial dose till the third or fourth day, when the patient will usually feel better and in many cases complain of hunger. The improvement after the second and subsequent injections often comes on the second or third day. There is frequently a "negative phase" after the injections, but it is not always shown so clearly. [From the literature of the subject it seems that, if large doses are used, the best results are given by doses of 300,000,000 to 1,000,000,000 killed bacilli and that doses of 10,000,000 to 200,000,000 are not so satisfactory. Ed.]

Brem and Watson thoroughly review the vaccine treatment of chronic typhoid bacillus-carriers and report some personal observations with this treatment in these infected individuals. Medical literature during the past five years has contained numerous reports of chronic typhoid bacillus-carriers, but there has been very little discussion of the treatment of these patients. The reason for this paucity appears to be that treatment has been unsatisfactory, and in but few cases has the infection been eradicated.

Dehler has cured by cholecystostomy two patients who discharged the bacilli in the feces, but the bacilli did not disappear from the stools of a paratyphoid-carrier on whom Forster did cholecystostomy for gall-stones. Grimme reported the recovery of an intestinal typhoid-carrier on whom cholecystectomy was done. Park failed to eradicate the infection in "Typhoid Mary," an intestinal carrier, by the use of intestinal antiseptics and hexamethylenamine; the latter drug was given in doses of 100 to 150 gr. daily. Park cites Lentz who stated that he could not get rid of the bacilli by any treatment. Albert reported the disappearance of bacilli from the urine of a carrier treated with hexamethylenamine, but no details were given and no statement made as to permanent recovery. Niepraschk had success with hexamethylenamine and boric acid (triborate of hexamethylene tetramine) in the treatment of a urinary carrier after he had failed with hexamethylenamine alone and in combination with resorcin. He gave this preparation in doses of 1.5 grm. four times daily. Hammond failed to cure an intestinal carrier to whom he gave hexamethylenamine for months.

Litterer treated by vaccination a patient with a discharging typhoid bone lesion. He estimated that there were 500,000 bacilli in a platinum loopful of the pus. He thought, justifiably, that the patient should be regarded as a chronic typhoid bacillus-carrier. Under vaccine treatment the patient showed great improvement, but was not entirely cured at the time of the report. This patient and another similar carrier were both cured by vaccination in three and two months, respectively.

Irwin and Houston have successfully treated a urinary carrier by vaccination after failure with hexamethylenamine. The bacilli disappeared after the third dose, and four subsequent examinations, covering a period of two months, were negative. Six vaccinations were given, the doses increasing from 50,000,000 to 1,000,000,000. Meader treated successfully by vaccination a patient who discharged bacilli in her feces. The patient had had typhoid fever thirty years previously, and had been exposed to infection five years previously. Before vaccination was begun, treatment was attempted with hexamethylenamine; 15 gr. three times daily for two weeks were given, and then 75 gr. daily. The large doses had to be discontinued after three or four days because of painful micturition. No diminution in the number of typhoid bacilli discharged in the feces could be detected. An attempt was then made to plant B. coli in the lower bowel in the hope that it would overgrow the typhoid organisms. Four doses, each about a pint, of a bouillon culture, were given per rectum. The typhoid organisms persisted in the stools, and treatment with lactic-acid bacillus tablets was tried; this also failed. Autogenous vaccines were then given at intervals of from one to two weeks. Six vaccinations were given, the doses increasing from 25,000,000 to 1,000,000,000, after which the stool cultures were negative on three separate examinations. Meader studied the bactericidal and agglutinating power of the blood during vaccination. The former rapidly rose, reaching its greatest power after 400,000,000 bacilli were injected; it then fell rapidly; and, seven days after 1,000,000,000 bacilli were injected, the bactericidal power had fallen to a point practically the same as when immunization work began. An interesting observation was that during the period of declining bactericidal power, the agglutinating power became evident in dilutions of from 1 to 500 in one hour. The first stool examination that was found negative was seven days after the above phenomenon. No examination was made for twenty-three days previously, so it is difficult to correlate the disappearance of the bacilli with the serum phenomena. Meader seems inclined to think that the high bactericidal power of the serum was immediately correlated with the disappearance of the bacilli; but the stool was positive for bacilli only three days before the examination which showed the highest point of bactericidal power, and ten days after the previous examination. The bacilli disappeared some time during a period of twenty-three days that covered the maximum point, the rapid decline of bactericidal power, and the rise and fall of agglutinating power.

Cummins, Fawcus, and Kennedy treated six typhoid-carriers and one paratyphoid A carrier. Two of these were urinary carriers and five intestinal. They used implantations of B. bulgaricus; they tried intestinal and urinary antiseptics, including hexamethylenamine (urotropin) alone and together with another diuretic; they attempted to influence the infection by acidifying the urine by means of the administration of sodium benzoate and acid phosphate of soda; they exposed the gall-bladder and kidneys to x-rays; and they vaccinated three patients with stock and autogenous vaccines.

One intestinal carrier recovered during the administration of B. bulgaricus in large doses, but others were not improved by it. An intermittent intestinal carrier ceased to discharge bacilli on two occasions after exposure of the gall-bladder to the x-rays, and the bacilli were not found in his stools when he was discharged from observation.

It was thought, however, that this absence of bacilli might be due to a natural intermission rather than to cure by treatment. Bacilli in the feces and urine, respectively, of two other patients decreased in numbers after *x*-ray treatment, but increased again when treatment was discontinued. Antiseptics reduced the number of bacilli, but when antiseptics were discontinued the number rapidly rose. Vaccination was carried out on three patients, one an intestinal carrier, two urinary carriers. It failed in all three cases to eradicate the infection.

The authors are sure, therefore, of the recovery of only one patient during treatment, an intestinal carrier treated with lactic acid bacilli (*B. bulgaricus*). They think that a combination of vaccination with hexamethylenamine in urinary carriers, and of vaccination with *x*-rays in gall-bladder intestinal carriers, may prove to be effectual.

Stone has reported one typhoid-carrier treated by vaccination. His patient was a urinary carrier, and recovered during treatment with autogenous vaccines. Six doses, increasing from 100,000,000 to 400,-000,000 were given, and stool cultures were negative after the sixth dose.

To sum up, three chronic intestinal typhoid-carriers have recovered after operations on the gall-bladder. One urinary carrier has recovered during the administration of hexamethylenamine in combination with boric acid (triborate of hexamethylene tetramine). One intestinal carrier recovered when lactic acid bacilli (*B. bulgaricus*) were implanted in the alimentary tract. One intestinal carrier apparently recovered after repeated exposures of the gall-bladder to *x*-rays. One intestinal carrier, two urinary carriers, and two carriers discharging bacilli from bone lesions have recovered during vaccination with autogenous vaccines. Cummins, Fawcus, and Kennedy ought to add to the number, one urinary carrier that likewise recovered during vaccination with autogenous vaccine. Altogether then there have been only 12 recoveries of typhoid-carriers as far as they had been able to find: 6 recoveries of intestinal carriers, 4 of urinary carriers, and 2 of carriers with bone lesions. Including their patient, 6 have recovered during treatment with autogenous vaccines. They report their case in detail and give the following summary.

There may be a question as to whether or not their patient should be considered a chronic typhoid-carrier. According to the classification of Frosch, she should be considered one. Frosch divided carriers into two groups: "Those who excrete bacilli for less than three months, and those who excrete them for three months and longer. The latter class constitutes the chronic bacilli-carriers, the *Dauerausscheidern* of the Germans" (Simonds). Their patient carried typhoid bacilli for about six months after the temperature of her typhoid attack remained normal, and, accepting Frosch's classification, she may be considered fairly as having been a chronic typhoid bacillus-carrier.

The possibility cannot be denied that the lesion which discharged bacilli may have undergone spontaneous healing without regard to vaccination. The authors prefer to say, therefore, that their patient recovered dur'ng vaccination, rather than that she was cured by the treatment. In the light of what is known of chronic typhoid-carriers and of the chronicity of post-typhoid lesions, however, it does not seem probable that recovery was spontaneous. One other objection might be made. Some typhoid-carriers, both urinary and intestinal, discharge the bacilli intermittently. It may be suggested with reason that the disappearance of bacilli in their case may have been due to an intermission. This was

possible. But the bacilli were present on eleven successive examinations covering a period of almost three months. The first urine examination made was negative for typhoid bacilli, but the result was probably due to faulty technique, for they had just begun making bacteriological examinations of stools and urines. It seems probable to them, therefore, that their patient was a continuous chronic typhoid-carrier, and that she made a permanent recovery during treatment with autogenous vaccines.

Bacteriological Considerations and Isolation.—The method of isolation of typhoid bacilli from the urine was that of Endo. Endo's medium is a heavy agar to which is added basic fuchsin, lactose and sufficient sodium sulphite to decolorize the fuchsin. The red dye, fuchsin ($C_{20}H_{19}N_3HCl$), is an acid salt of rosanilin, a colorless leucobase. The acid component of the red rosanilin salt is easily reduced by sodium sulphite. When lactose-fermenting organisms grow on the above medium, the acid formed combines with the decolorized rosanilin and the colonies are stained red. The heavy agar medium is exactly like "ordinary" agar, excepting that 20 grm. of agar-agar per 1,000 c.cm. are used instead of 15 grm. To 1,000 c.cm. of the agar medium are added lactose, 10 grm. basic fuchsin, 1.8 c.cm. of a 10 per cent solution in alcohol; and sodium sulphite should be added until the red color has changed to a faint pink. The agar medium can be prepared in bulk to be kept in stock, but the fuchsin, lactose and sodium sulphite should be added just before pouring into the plates. 100 c.cm. of the medium will make about four or five plates, which should be 12 to 15 cm. in diameter. The plates are exposed to the air (covered with clean paper), for one hour, during which they harden and dry. One loopful or more of the material to be examined is then placed on the surface of the first plate, and with a sterile bent glass rod it is spread widely over the surface; the rod is then stroked over the surface of the second plate; then the third, and so on. The plates are covered, wrapped in paper to exclude light and incubated for twenty-four hours. The colonies of the lactose-fermenting organisms are then red, while the colonies of non-lactose-fermenting organisms are colorless. The method thus furnishes an easy way of isolating typhoid, paratyphoid and dysentery bacilli. The organism that causes difficulty most frequently is *B. fecalis alkaligenes.*

Identification.—The organisms that were isolated from the urine were small, actively motile, Gram-negative bacilli. They formed small, 1 to 2 mm. diameter, translucent colonies with a bluish refractility on agar plates. Litmus milk was slightly acidified by them and remained acid. There was an invisible growth on potato. No indol was formed in Dunham's peptone medium. Bouillon showed a general turbidity without pellicle or sediment. There was no gas formation in any of the semi-solid litmus sugar media; acid formed in dextrose mannite, galactose and dextrin; there was no change in lactose, saccharose or dulcite. The organisms were agglutinated by the serum of a typhoid patient (the child's mother) in a 1 to 50 dilution in one hour. After the child was vaccinated with her own organisms, her serum agglutinated a stock culture of typhoid bacilli in a 1 to 200 dilution in one hour and in a 1 to 1,000 dilution in six hours. The summary is as follows. (1) Practically the only treatment given was vaccination with autogenous vaccines. Nine doses were given, increasing from 25,000,000 to 1,500,000,000. The bacilli decreased gradually and disappeared after the ninth vaccination. Eleven successive urine cultures were positive for *B. typhosus* and then five successive cultures were negative. (2) The total duration of the bacilluria, from the

time of normal temperature, was about six months. The patient appeared to be a continuous carrier. (3) It seems that the disappearance of the bacilli was not an intermission, but a true recovery brought about by the gradual healing of a chronic lesion under the influence of vaccination.

Stone advanced the theory that the factors of acquired immunity in typhoid were largely concerned with the process of phagocytosis, and those antibacterial elements which make phagocytosis possible, i. e., the opsonins and stimulins. The other antibacterial elements, the bacteriolysins, bactericidins and agglutinins, while possessed of certain powers antagonistic to the infection during and immediately subsequent to the attack, were considered, according to work so far done, of lesser value in the perpetuation of such immunity.

In this disease, as in many others accompanied by leucopenia, the problem of active immunization seems to resolve itself into a study of these measures which primarily augment the number of leucocytes, with secondary augmentation of those antitropic substances which render the leucocytes capable of phagocytosis. After recovery from typhoid, as from certain other acute infections, the immunity acquired by the body-cells usually lasts during the lifetime of the individual. As shown, however, in the previous study, the immunity thus induced may vary greatly, and it is not at all uncommon to find that more than one undoubted attack has occurred within six or seven years. Dreschfeld's figures, based on 2,000 cases in the Hamburg General Hospital, showed that only 0.7 per cent. were affected twice. It is probable, however, that the incidence of multiple infection is greater than these figures indicate.

On the other hand, it must not be forgotten that other bacteria may produce conditions which are clinically identical with typhoid, and which many times are diagnosed as typhoid. The differentiation of typhoid-like paratyphoid, colon and paracolon infections is by no means easy under the most favorable circumstances. Some types of meningitis and *Bacillus coli septicemia* may give positive Widal reactions in dilutions usually considered diagnostic of typhoid, and when made by an observer familiar with the motility of the strain. Lumbar puncture will, it is true, in most cases, clear up the diagnostic atmosphere in cases which are suspected to be typhoid but in which there are positive Babinski and Kernig signs; while blood cultures, in septicemia due to the *Bacillus coli communis*, will usually give sufficient evidence for differentiation. Certain strains of *Bacillus* coli, however, may not produce indol or coagulate milk, and differentiation may be possible only after prolonged cultural and animal tests.

The virulence of the infection—a factor of importance, but unfortunately, in our present state of knowledge, difficult to ascertain—undoubtedly has much to do with the problem of immunity; since, if overwhelming in one instance, slightly active, long-persisting immunity may follow. This is in accord with our present knowledge of all infections which produce their destructive results through growth and death of the bacterial cell within the body, i. e., by so-called "endotoxins." The problem is somewhat different in such infections as diphtheria, pneumonia, or tetanus, which do their damage through toxins elaborated during the life of the bacterial cell. The efficient neutralization of these toxins, in all probability a purely chemical problem, is followed by recovery but not an efficient immunity.

One of the most interesting problems in typhoid was in connection with typhoid-carriers, i. e., the persistent elimination of bacilli for years after

recovery, and during an interval when the individual shows increased resistive powers by methods calculated to measure his state of immunity. Such immunity, which may be designated as partial or incomplete immunity, is in all probablity sufficient to protect the body-cells against the damaging influence of the infection, but insufficient to exert any destructive or antagonistic power directed toward eradication of such infection. In other words, the phagocytic power may be higher than normal, while the bacteriolytic and bactericidal powers may be low. In practically all reports of typhoid-carriers such individuals were not seriously inconvenienced by the presence of the infective agent which earlier, before partial immunity was established, produced manifestations of the disease. According to Park, in most chronic carriers, the bacilli are eliminated with the feces, while the urine contains the bacilli in a relatively smaller number.

Connell regards the bile as the medium in which the bacilli perpetuate themselves. He regards the feces as a greater source of danger during the active stage of the disease, and the urine as the greater spreader of the disease during the decline and post-febrile stage. Forster believes the gall-bladder to be the site of constant reproduction of the bacilli, which are intermittently ejected into the intestines; a view also held by the Ledinghams, since investigations have shown that the bacilli may disappear during convalescence, only to reappear several months later.

Typhoid-carriers who become such through association with the disease, "contact carriers"—and such instances are not uncommon among nurses and orderlies who themselves have not had typhoid to their knowledge—likewise show tolerance to the presence of the germs without inconvenience. Their tolerance is probably to be explained as due either to a natural immunity or to partial immunity from an earlier unrecognized mild typhoid infection. From this standpoint it is not illogical to assume that the measure of immunity which protects the individual, during and subsequent to attack against the infection itself, is to be found largely in those antitropic substances which are concerned with an augmented power of phagocytosis; while lowered antibacterial substances, such as the bacteriolysins and bactericidins, permit the infection to persist for years in the individual without serious damage to himself, but without eradication of the bacterial elements. The history of typhoid-carriers varies greatly. In most instances they have been discovered in hitherto unexplainable endemic outbreaks among the inmates of asylums or among families who have happened to employ the same cook or obtained milk from a dairy previously under suspicion because of its possible connection with earlier endemics. A larger number of typhoid-carriers, in the sense that they have been the cause of endemics, have been women who have in some way been connected with the preparation or handling of food products. Houston, in 1899, reported the first case of persistent typhoid bacilluria in a "contact" typhoid-carrier, who for three years had shown symptoms of chronic cystitis. The largest number of recorded cases having origin from one source was reported by Lumsden and Woodward, who found a typhoid-carrier in a dairy responsible for 54 cases of the disease among the dairy customers.

The time since the original attack has varied from one to fifty-four years. Scheller, who investigated an endemic on an estate in Prussia, found that during a period of fourteen years, 32 cases of typhoid had occurred, traceable to a woman employed in the dairy, whose attack had occurred seventeen years previously. Typhoid bacilli were found in

her stools in almost pure culture. Out of forty people who drank of the milk of this dairy, 18 were found to be typhoid-carriers, and yet only 5 of the 18 had ever had typhoid. Such individuals must be considered "contact carriers," as before mentioned.

Soper's most painstaking investigation showed that in six years 26 cases of typhoid could be traced to a cook employed successively in households where the disease appeared. Typhoid bacilli were obtained from her stools; none were found in the urine; her blood gave positive agglutinative tests. The Ledinghams, in the course of a study of the inmates of a Scotch asylum where typhoid had been endemic, found 30 typhoid-carriers out of a total of 90 women examined.

Gregg has reported the case of a boarding-house mistress who served as the source of infection in 7 cases of typhoid fifty-two years after her own recovery. No bacilli were found in the blood or urine, but pure cultures were obtained from the feces. Jundell has described the conditions present in a family the mother of which was shown to be a typhoid-carrier, over fifty years after her attack. During an interval of fifty-four years, twenty-two members of the family were attacked. This carrier was eighty-three years old and her feces were found to contain typhoid bacilli. Huggenberg reported 13 cases of typhoid in a family traceable to the mother, whose attack had occurred thirty-one years previously, and whose feces contained the bacilli.

Park has estimated that fully 2 or 3 per cent. of typhoid convalescents become chronic carriers, in the sense that the bacilli persist after years in stools and urine, and as such are dangerous to the community. Probably not more than one-half of such carriers actually infect others.

Colon bacillus infections of the urinary bladder in women are relatively common for anatomic reasons. It has been found exceedingly difficult in Park's experience to differentiate some forms of bacilluria due to the *Bacillus coli* from chronic typhoid bacilluria. He had under treatment 2 cases in which the cultural methods were confusing. Neither individual, to his knowledge, has had typhoid fever. Both were considered from the early cultural tests as "contact" typhoid-carriers; but latterly, the same strains, which in the beginning did not produce gas in glucose gelatin, or produce indol, or coagulate milk, have been found to do so in slight amount, and the earlier expressed opinions are open to question.

One may differentiate these cases, in another way, i. e., by the local reaction to injection of autogenous vaccine. The colon vaccine is much more toxic than typhoid vaccine, although occasionally one may meet a relatively non-toxic colon strain. As a rule, however, an injection of 50,000,000 colon bacilli produces a local reaction equivalent in intensity to a dosage of 300,000,000 of typhoid bacilli. The typhoid-carrier problem is a perplexing one, since in certain American cities, where for years the disease has been endemic with a consequent large number of unrecognized carriers, the installation of adequate filtration plants, while reducing the disease incidences, will not for years to come rid these municipalities of typhoid. Popular education seems to offer a partial solution of the problem. Patients convalescent from typhoid should understand that from 2 to 5 per cent. of those who have the disease harbor the bacilli in their gall-bladders, intestines and urinary tract for periods of years, and under such conditions become a source of constant danger to others.

It will be obviously impossible to control any large percentage of typhoid convalescents by bacteriological tests, but it will be possible for

physicians to educate their patients and always to bear in mind the possible connection between the earlier attack and symptoms, sometimes slight, referable later to the gall-tract, to a slight urinary cystitis, to a recurring mild dysentery, or headaches supposed to have their origin in faulty metabolism. Segregation of individuals, known to be chronic carriers, may be regarded as practically impossible. Since every typhoid patient requires the constant care of at least two, usually three individuals, it can readily be surmised that a large percentage of such attendants become "contact carriers" without themselves manifesting symptoms of the disease. Park has estimated that "probably one in every five hundred adults, who has never knowingly had typhoid fever, is a typhoid bacillus-carrier."

So-called urinary and intestinal antiseptics such as phenyl salicylate (calol), sodium phenolsulphonate and hexamethylenamine have been found to possess little value in the treatment of chronic typhoid infection. Treatment by autogenous or stock bacterial vaccines seems to offer more chance of success. It has been shown by the extensive work of Wright and Leishman and his co-workers that the bactericidal and bacteriolytic properties of the blood-serum are augmented to a certain degree by the injection of typhoid vaccine. The bactericidal substances are increased four- or five-fold by inoculations of typhoid vaccine. The bacteriolytic substances are also increased so that, as a rule, the serums of inoculated subjects, when diluted 1 to 10 and mixed with living typhoid bacilli, will cause either complete disappearance of the organisms or their reduction to amorphous masses.

A stock vaccine is quite as efficient as vaccine prepared from recently isolated autogenous strains. On the other hand, for various reasons, it is probably better to use a vaccine prepared from the patient's organisms. Irvin and Houston have reported disappearance of the infection by treatment with an autogenous vaccine in a patient who had contracted typhoid seven years previously. In the course of the seven years, six persons living in the same house as the patient developed typhoid. Stone's conclusions are (1) the time element is an important factor in the reaction of susceptibility to inoculations of bacterial vaccines in typhoid-carriers. Typhoid-carriers, injected within a comparatively short time after their infection, will in all probability, receive more benefit from properly prepared autogenous vaccine than from any other known form of treatment. (2) "Contact carriers," who never to their knowledge have had typhoid, are more susceptible to the inoculations than carriers who have had a definite attack of this disease, and who are in all probability more immune. (3) Where the infection has persisted for years, it may be difficult to clear up the condition by bacterial inoculation. This effort should at least be made, since in the somewhat similar condition—chronic carriers of apparently non-virulent tubercle bacilli—the bacilli often disappear from the sputum during a course of inoculations of some one of the tubercle products. (4) The immunity manifested by typhoid-carriers is in all probability a partial immunity in the sense that while these individuals are protected against the infection through an augmented phagocytic power held by their body-cells, the antibacterial substances such as the bactericidins and lysins are lessened to a degree insufficient to exert any destructive power against the infection.

With the fact of typhoid gall-bladder infections occurring fairly constant during the course of typhoid fever, many times without physical findings, referable to the gall-bladder, an attempt was made by the writer to determine the value of what was considered the most effica-

cious drugs and vaccines to prevent or relieve such local infection. Only those drugs which have been proved to be excreted in the bile and to have some decided bactericidal action in this fluid were used—namely, urotropin and menthol. Hexamethylenamine, as had been proved by Crowe, when given internally in sufficient dosage, is excreted in the form of formalin into the gall-bladder in sufficient amounts to produce decided antiseptic effects upon typhoid bacilli. Knich and Ringsheim have experimented with a great variety of drugs administered internally in regard to their antiseptic action upon the contents of the gall-bladder. The great majority of these, known as cholagogues or biliary antiseptics, such as calomel, salicylic acid, oil of turpentine, etc., were entirely inert. The drugs exerting the strongest antiseptic action were menthol and hippol (methylene-hippuric acid). Urotropin was active only when much larger doses were given. Besides these drugs, which were employed both for possible preventative and curative effects upon local typhoid infections or typhoid metastases, typhoid vaccines were used in both series of cases in the same capacity. They were consequently not used simultaneously in any one series of cases. For instance, one series of cases were given the different drugs as preventatives during the first two weeks of the disease; then, if complications in the form of local typhoid infections occurred, vaccines were exhibited as active agents. The previous year the vaccine was given as preventative throughout the course of the disease, and a different drug was used as a curative measure for local typhoid infection. The dosage of urotropin was 40-80 gr. daily; menthol, 12-20 gr. daily, and vaccine, 50,000,000 bacilli subcutaneously every other day. The vaccine that was used in these cases was attenuated typhoid bacilli, furnished by the experimental department of Parke, Davis and Company. During the year 1910, 13 cases of typhoid fever were treated by giving vaccine throughout the course of the typhoid, from the time the case was first observed. If the fever did not terminate by lysis during the third week, or have any definite complication of local typhoid infection in the gall-bladder or otherwise, the patient was placed upon urotropin and salol. During the year 1911, in 14 cases, the reverse of this treatment was instituted. In other words, the patient was put upon menthol from the first observation until the second week. The vaccine treatment was reserved for those cases which failed to terminate by lysis, after the second week, or developed definite local typhoid infections. The results of these observations, given tersely, are as follow. In the first 13 cases unquestionable gall-bladder infections occurred in 2 cases besides local infections occurring in other organs in 4. In the second series of 14 cases there also occurred two unquestionable cases of gall-bladder infection besides local typhoid infections of other organs. The course of the disease, duration, etc., was not materially affected. The acute cholecystitis occurring in the 4 cases ran practically the same course as an acute attack of cholecystitis upon simple symptomatic treatment. All cases were quiescent, and on discharge had no symptoms referable to the gall-bladder. This was not taken to indicate, however, that this organ was free from infection. In all probability they will terminate as cases of chronic cholecystitis.

While this limited number of cases could not be cited as convincing proof of the efficacy of this treatment, it would indicate that in this series neither the known biliary antiseptics or typhoid vaccines had had any marked effect upon the prevention or cure of primary typhoid gall-bladder infection. The ultimate outcome of the effect of such treatment, however, can only be judged by extended observation.

DIAGNOSTIC AND THERAPEUTIC NOTES.

OXYGEN INHALATION.—Lauder-Brunton (*Brit. Med. Journ.,* February 17th, 1912). Most of the apparatuses for the inhalation of oxygen are either ineffective or demand more or less co-operation on the part of the patient. The writer describes a method of administering oxygen, that in some respects is superior to the methods in general use. It is simplicity itself. The inhalation tube forks into two branches each of which terminates in an olive-shaped end-piece like that used in the Politzer bag. One of these end-pieces is inserted into each nostril, which it fits snugly. The patient can thus comfortably inhale the oxygen, in any posture and without any exertion on his part. The writer especially recommends the use of oxygen inhalations, by means of this apparatus, in pneumonia.

THE BLOOD OF RADIOLOGISTS.—Lhermitte (*Sem. méd.,* No. 5, 1912). It is not always easy to determine whether the x-rays are really producing profound alterations in the organism of the radiologists. The writer has found that the leucocytes form a delicate index as to whether the rays are injuring the operator. There is a leucopenia, the white blood-corpuscle count being 5,300 to 6,000 per c.mm. There is an absolute lymphocytosis, while the eosinophil cells are reduced in number or entirely absent. The red corpuscle count is approximately normal. These changes enable one with certainty to conclude that the rays are injuring the operator and indicate the necessity for extreme caution on his part

THE TREATMENT OF GONORRHEA AND ITS COMPLICATIONS BY MEANS OF GONOCOCCUS VACCINE.—Hagen (*Med. Klinik,* No. 7, 1912). Gonococcus vaccine proved entirely useless in gonorrheal urethritis and in all resulting complications that were not strictly localized. The vaccine deserves a trial only in epididymitis, in vesiculitis, and in chronic gonorrheal hydrarthrosis. Even in these conditions, one must be very cautious about using it if there is any acute inflammatory process, as a severe exacerbation of the latter may result. In chronic and strictly localized gonorrheal processes, good results are sometimes obtained.

OPHTHALMO-REACTION IN TYPHOID FEVER.—Austrian (*Bull. Johns Hopkins Hosp.,* January, 1912). The reagent used by Austrian consists of the endotoxins obtained from bouillon cultures of 80 different strains of typhoid bacilli. The bacilli are killed, rubbed up finely and extracted with water. Their protein is precipitated from this solution by means of alcohol, washed and dried. Of this protein, 10 mgrm. are dissolved in 1 c.cm. of water and one drop of this is instilled into the inferior conjunctival sac of one eye.

The reaction is considered positive if the conjunctiva of the lower

lid and of the caruncle shows reddening and swelling within five hours after the instillation. The reaction attains its maximum in about six hours and lasts at least twenty hours. A reaction confined to the conjunctiva of the bulb with little or no participation by that of the lid is not considered specific.

All but 5 out of 75 cases of typhoid fever reacted positively; 190 nontyphoid subjects gave a negative reaction. The reaction occurs in the first week of the illness, being thus found positive earlier than the Widal test. It lasts during the entire febrile period, and disappears during convalescence. If further work confirms Austrian's results, a reagent, which he calls "typho-protein," will doubtless soon be placed on the market, and should prove a valuable diagnostic agent.

―――――

Adalin, a New Sedative and Hypnotic.—Gudden (*Muench. med. Wochenschr.*, No. 2, 1912). The chief indications for the use of adalin are cases of chronic insomnia due to neurasthenia, hysteria, cardiac neurosis, organic heart lesions, mania, dementia precox and the like. As adalin is absorbed slowly from the digestive tract, especially if given in cold water, Gudden advises its administration in divided doses, *i. e.*, 0.25 to 0.5 grm. three or four times daily. It may, however, be given in doses of 1.0 to 1.5 grm., in hot water or tea an hour before retiring. It then usually produces satisfactory sleep. Its advantages are its low toxicity, the absence of unpleasant after effects, and the fact that it does not result in the establishment of a habit even when given repeatedly.

Our own experience with adalin has been very satisfactory. We give three 5 grain tablets an hour before bedtime. The best results we have seen in insomnia due to worry, exhaustion and the like.

―――――

The "Milk Cure" in Heart Disease.—His (*Therap. Monatschr.*, No. 1, 1912). His strongly advocates the use of the Karrell milk-cure in cases of broken compensation. The patient is put to bed and receives nothing but milk, in a total daily quantity not exceeding 800 to 1,000 c.cm., for six days, after which the diet is gradually made more generous. While some cases prove quite refractory, most of them improve rapidly under this diet. Bad results do not occur if the physician individualizes sufficiently and does not prolong the rigid diet too greatly. Its chief indication is in cardiac dropsy, but it is also useful in cardiac asthma, myocardial degeneration, angina pectoris, renal insufficiency, fatty heart, weakness of the right ventricle, and finally as an adjuvant to digitalis medication. Just how this "cure" acts is not quite definitely established. Probably several factors play a part, such as the small percentage of sodium chloride and albumin in the diet, its easy digestibility, and the absence of abdominal distension.

―――――

Salvarsan.—Nicoles and Montot (*Annales de Malad. Vener.*, No. 1, 1912). The authors, who are both *chefs de clinique*, summarize their experiences by stating that they definitely reject the intramuscular and subcutaneous methods in favor of the simpler method of intravenous injection. They admit that the curative value of "606" is undeniable; that it is rapid, energetic, resolvent, and cicatrizing in its action, and, in these respects, superior, in all syphilitic states, to any other remedy. They

also point out the value which it probably possesses in certain extra-syphilitic conditions. But they deny it any value in tabes, general paralysis, "pigmentary syphilis," and leucoplakia. They make a very important point in asserting, further, that "606" has practically no preventive action—that is to say, young persons who are treated by it in early stages often present themselves for treatment, soon after, with fresh infections. The only immunizing effect which the authors have noticed is that the latent period is sometimes, in these cases, prolonged a little.

Since, so say Nicoles and Montot, "606" has no preventive action, and accidents do occur in considerable number, even after its most careful administration, we ought to restrict its use to certain cases in which there are certain definite indications. It is allowable at present, for instance, to give it at the very earliest appearance of a chancre, in the hope of aborting the disease, though this practice may have in the future, with fuller experience, to be abandoned. It is proper to give it when mercury fails or is not tolerated; when occasion requires swift and energetic action; and when prophylactic considerations have to be borne in mind. Doses must, however, be moderate, and 0.4 or 0.5 cgrm. should only be given exceptionally, in spite of the fact that such doses have a more marked therapeutic effect than lesser ones. The illness must never be considered cured merely because all symptoms have disappeared after two or three injections; and adequate, persistent, and prolonged mercurial treatment must always be enjoined. Finally the authors say, epigrammatically, that "606" can neither exclude nor replace mercury. It must be reserved for certain cases, and, even so, must always be assisted by mercury.

SUBCUTANEOUS INJECTIONS OF OXYGEN.—Maisonnet (*Sem. Méd.*, No. 3, 1912). The administration of oxygen by subcutaneous injection instead of by inhalation in conditions of asphyxia has found favor with several Continental physicians. Dr. Maisonnet, of the military hospital of Val-de-Grâce, reports on 5 cases, including post-operative conditions, pneumonia, and bilateral empyema. The skin being sterilized, the injection needle is introduced under the skin of the thigh, care being taken not to penetrate a vein. To this is fitted an india-rubber tube connected with an oxygen bag and fitted with a glass tube containing cotton wool to filter the gas. By compressing the bag, the gas flows slowly into the tissues. The duration of the injection is about twenty minutes. The flow of gas may be continued till a swelling is formed similar to that caused by an injection of 300 grm. of serum. Gentle massage causes diffusion and absorption of the gas. The injections may be repeated twice a day. As a result, dyspnea and cyanosis are said rapidly to disappear, and the patient has a feeling of well-being. The respirations diminish in rapidity and their amplitude increases. The pulse-rate is also diminished and the general condition improves. Dr. Sacquepée, professor of the military medical school of Paris, also reports favorably on the treatment in cases of pneumonia. The injections of oxygen were followed by marked improvement in the patient's condition, which usually continued for twelve hours after the injection. The pulse-rate fell by ten to twenty pulsations a minute, and the respiration-rate by as much as a third or a quarter of the number of respirations per minute. There was no definite effect observed upon the pulmonary lesions, temperature, or course of the disease,

but by repeating the injections the patient is kept in a much better general condition. At the time of the crisis, especially, they seem likely to prevent syncope or other dangerous symptoms.

THE RADICAL CURE OF HERNIA IN INFANTS AND YOUNG CHILDREN.— Kellock (*Proc. Roy. Soc. Med.*, January, 1912). The writer attaches considerable importance to the congenital origin of inguinal hernia in young children, so far as the sac, at any rate, is concerned, and thinks that the only "acquired" factor is the protrusion of some viscus into an already existing sac. He holds that operation can and should be done at an early age, and believes that a suitable procedure is the one he has reduced to a very simple form. Some importance is attached to preparatory treatment: an infant who has a hernia of any size is kept for a few days before the operation in the Trendelenburg position, with the feet and legs over a wedge pillow, so that the hernia is kept out of the way. In the operation itself, an inch incision is made through the skin at right angles to the direction of the cord, and just above the external abdominal ring. This incision is well away from the genitals, and is accompanied by very little bleeding. The coverings of the cord being divided longitudinally, the sac is found, isolated, drawn down, transfixed and ligatured as high up as it can be reached, and the skin wound then closed.

THE TREATMENT OF CANCER.—Coley (*Guy's Hosp. Gaz.*, No. 1, 1912). In an interesting clinical address, Coley reviews his results in the treatment of malignant tumors by means of bacterial toxins. The origin of his method lay in the observation that malignant tumors often retrogress after accidental infection with erysipelas. At first he inoculated such tumors with living streptococci, but soon desisted on account of frequent alarming or even fatal infections.

Since then he has used streptococcus toxins, at first alone, later in combination with prodigiosus toxins, the so-called Coley's fluid. His best results were obtained in sarcomas. In general, he considers his treatment indicated only if the sarcoma is inoperable; but of late he has come to the conclusion that osteosarcomas that would necessitate amputation of a leg or arm justify a trial with Coley's fluid. He reports a number of such cases cured, apparently permanently, without operation. He has so far succeeded in curing 65 cases of inoperable sarcoma, nearly 20 per cent. of the cases treated by him. Of these, 7 have remained free from recurrence for eighteen years, 7 for ten to fifteen years, 17 for five to ten years, 10 for three to five years. Besides his own 65 cures, he has received reports of 30 cases of inoperable sarcoma cured by others.

He begins with ¼ minim, injecting daily and increasing the dose slowly until a febrile reaction results. The first injections are made not into the tumor but elsewhere. Later the injections are made alternately into the tumor and elsewhere, sometimes intravenously. The dose requisite for the production of the first reaction varies, sometimes reaching 5 or 6 minims; after it occurs, the injections are given every other day or at longer intervals, excessive reactions being avoided. The treatment must often be continued for a long time, sometimes for years. When successful, the treatment results in a poor nutrition and increased mobility of the tumor. This may often be observed after a few treatments. Later, the tumor begins to grow smaller and finally disappears.

SOCIETY PROCEEDINGS.

ST. LOUIS MEDICAL SCIENCE CLUB.

The May meeting of the St. Louis Medical Science Club was held Tuesday evening, May 14th, at 8:30 p. m., at the Barnard Free Skin and Cancer Hospital. The following was the program of the evening:—

1. Demonstrations: (*a*) Experimental Pyloric Exclusion
   ....Willard Bartlett.
   (*b*) A Pre-cancerous State....George Gellhorn.
2. Sinus Stimulation as a Factor in the Resuscitation of the Heart
   ....Joseph Erlanger.
3. Autoplastic and Homeoplastic Transplantation of Pigmented Skin in Guinea-Pigs (with demonstration)........Llewellyn Sale.
4. Fatty Acid Esters of Glucose....................W. R. Bloor.
5. The Relation of Pulse Pressure to Renal Function..R. A. Gesell.

(Signed) W. E. GARREY, *Secretary.*

SINUS STIMULATION AS A FACTOR IN RESUSCITATION OF THE HEART.

By JOSEPH ERLANGER, M. D., of St. Louis.

Not infrequently, direct massage alone fails to resuscitate the heart in cases which are, to all appearances, very favorable for resuscitation. One of the causes of such failure is the failure of the auricles to become spontaneously rhythmical. The clew to the factor here described was obtained from some experiments in which it was shown that strips of the cat's auricle, when suspended in Locke's solution and stimulated tetanically during brief periods, can be made to beat spontaneously for many hours; and that the same treatment of a strip that is spontaneously rhythmical increases the rate of beat and the strength of the impulse. These results are obtained only when the sinus region of the heart is stimulated. It has been found that brief tetanic stimulation of the sinus region of a perfused heart, which has failed to beat owing to the failure of the development of spontaneity, may once and for all restore the normal sequence of beat. In such cases stimulation of parts of the auricle other than the sinus region has not restored the normal heart beat. Experiments made on the exposed dog's heart, brought to a standstill by the administration of chloroform or by asphyxia, have demonstrated the value of this factor in resuscitation of heart *in situ.* In these cases direct massage of the heart takes the place of the immersion of the strip or the perfusion of the heart. The massage was applied in such a way as not to obscure the value of stimulation of the sinus region. A satisfactory method for the resuscitation of the whole animal, based upon this factor, has been developed. A sound electrode has been made by means of which the stimulus can be applied to the sinus region through the unopened chest. The massage was given subdiaphragmatically. Several animals which could not be revived from apparent death by means of massage alone have been revived under the combined method.

AUTOPLASTIC AND HOMEOPLASTIC TRANSPLANTATION OF PIGMENTED SKIN IN GUINEA-PIGS.

By LLEWELLYN SALE, M. D., of St. Louis.

In these experiments black skin of guinea-pigs was transplanted onto defects in the white skin of the ear of animals of the same species. In each series of experiments two animals were used and pigmented skin was grafted onto the same and also onto the other animal. The main purpose of the work was to observe and compare the fate of the autoplastic and homeoplastic transplantations. Altogether twenty experiments were done. Some of the grafts came off within twenty-four to thirty-six hours after the operation. In these cases some mechanical factor was the cause. In sixteen instances, the autoplastic graft took. In twelve of these the pigmented skin began to grow and to extend into the host tissue. This phenomenon began in varying periods after the operation (sixteen to thirty-nine days). Dr. Leo Loeb, in former experiments, had noted the same thing. The homeoplastic graft behaved quite differently. In eight cases the graft took, but in periods varying from four to thirty-six days it was cast off, and the defect healed in the usual way. In four instances the homeoplastic transplant adhered and was incorporated in the host tissue. The white skin of the host soon began to invade the pigmented transplanted skin. This invasion began at the periphery and continued as long as the animal was under observation. In two experiments the transplanted pigmented skin was entirely replaced by the invading white skin of the host.

FATTY ACID ESTERS OF GLUCOSE.

By W. R. BLOOR, Ph. D., of St. Louis.

The communication consisted of a preliminary report on the preparation and properties of some members of a new class of compounds—the fatty acid esters of glucose.

The interest in compounds of this type is threefold:—

1. The relationship which has been shown to exist between carbohydrates and fats in metabolism.
2. The natural occurrence of this and similar compounds.
3. The possible usefulness of such compounds in the study of fat metabolism.

Method of Synthesis.—The synthesis of the fatty-acid esters of glucose depends on the action of the chlorides of the fatty acids on glucose in solution in pyridin, the pyridin acting both as solvent and catalyser.

$$C_5H_5N + R \cdot C \overset{O}{\underset{}{\diagup}} - Cl = C_5H_5N \overset{Cl}{\underset{\underset{O}{\overset{\|}{C \cdot R}}}{\diagdown}} \text{(Intermediate addition product.)}$$

$$C_5H_5N \overset{Cl}{\underset{\underset{O}{\overset{\|}{C \cdot R}}}{\diagdown}} + C_6H_{12}O_6 = RCO \cdot OC_6H_{11}O_5 + C_5H_5N \overset{H}{\underset{Cl}{\diagdown}}$$
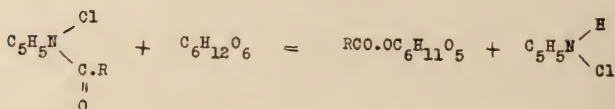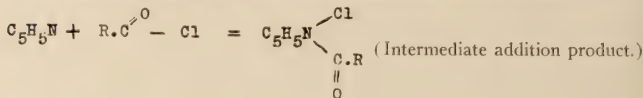
25 grm. of dry glucose is dissolved with the aid of heat in five to ten times its weight of pyridin, the solution cooled and an equimolecular amount of the chloride of the fatty acid added in small portions with

cooling. The mixture is allowed to stand over night, then poured into iced dilute sulphuric acid. The esters separate and float on top, and are freed from the liquid (in the case of the higher fatty acids) by filtering on a suction funnel. The mass is then boiled out several times with water, until it is free enough from electrolytes to form a colloidal solution. It is caused to separate from the colloidal condition by the addition of sodium sulphate, let cool and the solid cake removed and dried. Separation and purification of the esters is effected by the use of ether and alcohol. A mixture of three compounds is obtained, one mono- and two di-esters.

The compounds reduce Fehling's solution and are optically active, the optical activity being less than that of glucose. They are readily saponified by acids or alkalies. The presence of glucose in the compounds was shown by saponifying the esters with acid alcohol, dissolving the glucose in water and preparing the osazone which was identified by the crystal form and melting point.

THE RELATION OF PULSE PRESSURE TO RENAL FUNCTION.

By ROBERT A. GESELL, of St. Louis.

The effect of changes of pulse pressure on renal secretion was studied in the intact kidneys of the dog. The method employed for altering the pulse pressure was to connect an air-chamber, under mean pressure, with the abdominal aorta, a few centimetres below the renal arteries. By varying the size of the air-chamber, the amplitude of the pulse was easily changed. Since velocity flow of blood through the kidneys is an important factor in renal secretion, the venous flow was measured directly from the renal veins under varying conditions of pulse pressure. The rate of flow was found to be absolutely constant, whether the pulse pressure was normal, diminished, or completely obliterated.

The effects of pulse pressure on renal secretion briefly summarized are as follow :—

(1) With the same mean pressure the amount of urine secretion as a rule varies directly with the amplitude of the pulse. There are, however, a few exceptions.

> (a) In one experiment in which the pulse pressure was diminished only a small amount, the urine flow was repeatedly slightly increased.
>
> (b) In a few instances the pulse pressure remained the normal size or even increased in magnitude on connecting the air-chamber with the abdominal aorta. In all these cases a copious flow of urine under normal pulse pressure stopped immediately when the air-chamber was placed in connection with the aorta.

These results seem to indicate that the magnitude of the pulse pressure is not the sole factor in altering renal flow. The suddenness of pressure changes—vascular shocks, and the shape of the pulse-curve may also be an important factor. The general reaction of the vascular system to the connection of an air-chamber with it needs further investigation.

(2) In two experiments in which albumin appeared in the urine, the amount varied inversely with the magnitude of the pulse pressure.

(3) With the same mean pressure the amount of chlorides and urea in the urine varies directly with the magnitude of the pulse pressure.

BOOK REVIEWS.

Diseases of the Nose and Throat. Comprising Affections of the Trachea and Esophagus. A Textbook for Students and Practitioners. By St. Clair Thompson, M. D., F. R. C. P., (Lond.), F. R. C. S. (Eng.) Physician for Diseases of the Throat and Professor of Laryngology in King's College Hospital; Physician to King Edward VII. Sanatorium; formerly Physician to the Throat Hospital, Golden Square; Surgeon for Diseases of the Throat and Ear to the Seamen's Hospital, Greenwich; and Surgeon to the Royal Ear Hospital, London. With 18 Plates and 294 Figures in the Text. New York: D. Appleton and Co. 1912.

The well-known name of the author leads us to expect a book of unusual merit, and certainly in this instance our best expectations are gratified. The book is a model in the breadth of its scope and in the elaboration of its detail. As stated by the author in his preface the usual chapters on anatomy and physiology are not included. This certainly seems a wise omission. Certainly the repetition of such chapters in every work is a vain repetition. In many instances it savors strongly of padding. As in German works of similar character, an extensive bibliography is given, wisely too at the bottom of the page on which the article in question is referred to. This means a considerable saving in time.

It would be superfluous to call attention to the many excellences of the book. Among the few may be mentioned the chapters on the tonsil question, the submucous resection of the septum, the involvement of the accessory sinuses and the differential diagnosis of diseases of the larynx. Although the views expressed on the tonsil question and method of operation are not in full accord with those of American specialists, still it may be a debatable question whether the trend of American surgeons on this subject has not become a trifle extreme. In the chapters on accessory sinus disease it is unfortunate that the epoch-making contributions of Uffenorde on the ethmoidal labyrinth should not be referred to, though the author seems to agree, in part at least, with Uffenorde's position.

Not the least valuable part of the work are the illustrations. These are both plentiful and illuminating. Better executed or better chosen photographs, colored plates and drawings have hardly been seen in any recent textbook. The work as a whole is certainly an ideal one for students, and cannot help but be a valuable reference work for practitioners. Unfortunately, in this country, among students at least, the preference seems to be for a work dealing with diseases of the ear as well as those of the nose and throat. This may interfere somewhat with Dr. Thomson's work attaining the popularity which it so well deserves.

Meine Praeparationsmethode des Operationsfeldes Mittels Jodtinktur. By Kgl. Rat. Dr. Antonio Grossich, Primarchirurg am Ospedale civico in Fiume. Berlin: Urban and Schwartzenberg, (Rebman Company, New York City). 1911. Price, 75 cents.

Grossich's method of sterilizing the skin by means of tincture of iodine is at present almost universally accepted by the leading surgeons. When Grossich first introduced this procedure in 1908, the simplicity of the method appealed to everyone and a good many of us wondered why we had not thought of it long before. In this little brochure Grossich has given a résumé of his observations on the use of tincture of iodine as a skin sterilizing medium in private and hospital work with a description of the methods employed and a chapter on alleged harmful after-effects. Practical experience has proved that the method possesses undoubted value and its simplicity suggests itself to the clinical worker. The reading of the brochure will be appreciated by all who are interested in the subject.

EDITORIAL.

MUELLER AND OSLER ON MEDICAL EDUCATION.

Professor Friedrich von Mueller, of Munich, to-day attracts more medical students than does any other internist. To those who know Mueller's qualifications and who follow his work, the reasons are patent. He, more than other leaders in Europe, offers that which cannot be obtained in America, for he represents a type of professor practically unknown in this country. Possessing a thorough training in all those scientific branches grouped under the misnomer of "laboratory medicine," and with an unusually wide bedside experience, he can present cases from a standpoint which overlooks nothing, and can furthermore stimulate students to most thorough work. Therefore, the young physician who sees in medicine more than a mere means of increasing wealth and who aspires towards some science in his art will find in Mueller the stimulus he needs.

American medical education in the altogether is in somewhat the same position as the individual. It finally knows its goal, and the attempts it is making towards this goal are becoming more effectual all the time. But it still has many years to go and much to learn before it will be able to mould the peculiar situation in this country to meet its ends. It too can listen to the clinics of Mueller and learn much, and if the subject of the clinic happens to be "medical education in London" it can leave the clinic wiser and better able to grasp its own problem.

From among the many valuable points brought out by Mueller's discussion of medical education, we shall select only a few,—those which at present seem most intimately bound with our own troubles; and it seems to us that our greatest trouble is in knowing how to provide capable physicians for everyone. That, of course, is the object of all medical education, although unfortunately there is considerable diversity of opin-

ion as to the definition of the word "capable," and perhaps even greater variation in the judgment of those whose final word stamps a man as capable of practising medicine. Our system of separate State Board examinations may make a man capable in the State of Pennsylvania and incapable in California; but perhaps here the example is not well chosen, because the rainy season on the Pacific Coast may produce diseases not discussed in the textbooks of eastern schools. However that may be, certainly a national examining board with power to grant national licenses in the German style would go a long way in producing a general standard of capability.

Readers of this JOURNAL will be familiar with much that Mueller says about the necessity of raising the standards of the clinical professors. We have more than once urged the paradox of a professor teaching medicine or surgery in the spare moments stolen from a busy practice, and we have argued more than once on the value of placing such professorships in the same position as the professorships in the pre-medical sciences. The university bears its name because it is to teach universal knowledge, and medicine belongs to the university. Is anything more illogical, more absurd than that part of the teaching of medicine should be in the hands of university professors and part left almost entirely to the vagaries of practitioners? We do not belittle at all the importance of the practitioner in a subsidiary rôle when we state that the very fundament of education demands that clinical teaching should be controlled by men who devote practically their entire time to teaching. We see a grave danger in store for some medical schools in this country, which, in an eager desire to follow the band-wagon, are raising the admission standards of students without any compensatory increase in standards of teaching. It will result, as a natural consequence, in this step, that the student being compelled to increase his knowledge in order to enter any medical school will select that school which offers the best teaching facilities. The poor school then which raises its admission requirements will receive stepmother treatment and will either have to be good or die.

Without discussing Mueller's opinions any further let us turn for a moment to Sir William Osler. America's debt to Osler is of the kind that passes to posterity, for he was the pioneer in this country in the demands for better medical education. In the same discussion of medical education in London, Osler takes up the question of the relation of the hospital to the medical school, and he advocates the division of a hospital into teaching units. Each unit should be devoted to one department of medicine and should have its own clinics, laboratories, and other acces-

sories for both teaching and research. Only by the use of hospital material in this manner can the student become familiar with disease. The clinical clerk working at the bedside under competent supervision can learn more practical medicine in three months than he could cull from a year's didactic lectures. Too often when clinical teaching facilities are lacking, capability as a physician is judged purely by ability to answer examination questions; and after all the best way of learning how to answer examinations is by cramming quiz compends.

Osler's contention then that all hospitals be used as part of the equipment of university medical schools is one that should be of special interest to Americans, because in America the loose connections now existing between school and hospital have kept back the advance of American medicine in an almost startling manner.

AN IMPORTANT CHAPTER IN ORAL SEPSIS.

When W. D. Miller, in the early eighties of the last century, published his epoch-making investigations into the pathology of dental caries, the more or less fanciful conceptions of this disease, i. e., the humoral, the electrical, the chemical and the "worm" theory received their death-blow. Miller defined caries as a chemico-parasitic process consisting of two distinctly marked stages—decalcification, or softening of the tissues, and dissolution of the softened residue. In the case of enamel, the second stage is practically wanting, the decalcification of the enamel signifying its total destruction. In the past, various erratic views have been promulgated regarding the nature of dental decay, some of them crude revivals of long abandoned theories and others emanations from minds that lacked the proper scientific training. Regarding the causes of decay, it should be remembered that the axiom—dental decay invariably starts from the outside of the tooth, an absolutely clean tooth never decaying—is a fixed law which has weathered all attacks made upon it. Miller has shown that the primary decalcification of the tooth-structure depends upon certain acids, especially lactic acid, which in turn results from the action of the omnipresent oral bacteria on food particles, principally carbohydrates. These food-stuffs, especially low-grade sugars and starches, readily lodge between and on the surfaces of the teeth, being held there in close contact by means of precipitated muzin. The acids in their nascent state become neutralized by attacking the calcium salts of the tooth-structure and thereby establish a break in the continuity of the enamel, this furnishing the starting-point of the future cavity. With the wide dissemination of

this knowledge, the cry for alkalinity of the mouth became the watchword of the dental and medical professions. Alkaline saliva and alkaline washes were the shibboleth of those interested in oral hygiene.

Illogical deductions are based on erroneous conceptions of the physiology and bacteriology of the mouth. The temporary alkalinity of the mouth does not alter the reaction of the continuously outpouring saliva. In general, micro-organisms require a neutral or a slightly alkaline pabulum for their existence, and the average mixed saliva, which usually shows an alkaline reaction, would be, biologically speaking, a suitable medium for the ready growth of most of the pathogenic germs. To check the virulence of the acid-producing germs in the mouth—the real factors of dental caries—with alkaline washes, is, for teleological reasons, a contradiction in itself. It is not the temporary neutralization of these acids which we seek when combating dental caries, but the inhibition and, if possible, the destruction of the acid-producing micro-organisms. As an analogy, it may be mentioned here, a city, scourged by an epidemic of typhoid fever as a result of an impure water-supply, does not merely depend on the medical care of the typhoid patients for the eradication of the epidemic, but on the removal of the cause—the polluted water-supply.

Very recently a most remarkable book has made its appearance, entitled "The Prevention of Dental Caries and Oral Sepsis,"* by Professor Pickerill of the University of Otago. Pickerill, by carefully conducted experiments, verifies the chemico-parasitic theory of dental decay as outlined by Miller. In addition, however, Pickerill claims that he has been actually successful in preventing the further progress of decay and completely checking the process in its very beginning. Regarding these claims he makes the following statements.

In several patients (children) who have been under constant observation during the past two years, and in whom caries was commencing, not only have no more carious cavities appeared, but those that were present have not progressed, and the surface has become quite hard. The condition which is known as arrested caries has, in fact, been established (this despite the fact that tooth-brushes have been used only quite spasmodically). Green stain was well established in one case, but now, with no other treatment, has practically disappeared. And, further on, Pickerill states that in order to prevent the retention of fermentable carbohydrates on and between the teeth and so eliminate or very considerably reduce the carbohydrate factor in the production of caries, starches and sugars should on no account be eaten alone; but should in

---

*Being the Cartwright Prize Essay of the Royal College of Surgeons of England for 1906-1910, with some additions. London: Baillière, Tindall & Cox. 1912.

all cases either be combined with a substance having a distinctly acid taste or should be followed by such substances as have been shown to have an alkaline potential; and the best of these undoubtedly are the natural organic acids found in fruits and vegetables.

From these most interesting statements of Pickerill, it can be seen that in the past too much stress has been placed on so-called antiseptic tooth-powders and ill-constructed mouth-washes. That this was a mistake must be patent to all close observers who have followed the various stages involved in the destruction of teeth. They may have assisted in mouth cleanliness; but, since dentistry has to-day marshalled its forces in line with those of medicine—and by this is meant Preventive Medicine—there can be no denying that the message which Professor Pickerill has just delivered carries an import that cannot but appeal to all those advanced students of dentistry who are quite ready to subscribe to the failure of the customary tooth-powders and mouth-washes as preventives of caries.

THE DIAGNOSIS OF PANCREATIC LESIONS.

The anatomical and physiological relations of the pancreas to the rest of the body are as interesting as they are important. Lying, as the gland does, in such close relationship to stomach, intestines, liver, and gall-bladder, it is easily understood how diseases of any of these organs may involve, by mere anatomical propinquity, the pancreas. Acute catarrhal jaundice may and probably often does produce a more or less marked inflammatory reaction in the pancreas, and vice versa carcinoma of the pancreas usually causes obstruction to the bile flow. Physiologically, the dual function of the pancreas of liberating substances directly into the blood-stream and of secreting juices through the ducts of Wirsung and of Santorini into the duodenum make the organ of vital importance in the body economy. Its relation to diabetes mellitus through the supposed activity of the islands of Langerhans is too well known to require re-capitulation here. But undoubtedly other disturbances of the same function may exist without producing a straight diabetes—comparatively mild derangements of the harmonious working of glycolysis. In such cases probably a diminished tolerance for carbohydrates exists, and tests for the recognition of such a condition are not difficult to perform.

But we wish here to emphasize other phases of disturbance in pancreatic activity, especially in relation to its external secretion. It will be remembered that generally there is more than one duct, from pancreas to duodenum, through which flow many powerful ferments. Pan-

creatic juice contains proteolytic, diastatic and lipolytic ferments, all necessary to intestinal digestion. Difficulty in recognizing the picture resulting from obstruction of these ducts has long resulted from ignorance of the existence of more than one path; and what was considered a complete experimental occlusion of pancreas from intestine was often merely a partial separation. Consequently, in one case, "occlusion of the duct" would be complete and would give a certain clinical picture; in other cases, the same words would paint an entirely different view. Only within the most recent times have certain definite conditions come to be associated with pancreatic lesions, and we wish here briefly to review the more important ones.

Reversing the usual procedure and emphasizing laboratory data at the expense of the clinical picture, let us consider first the urinary changes. Glycosuria may or may not be present, and the same can truly be said of the Cammidge reaction. Practically all recent authentic work has shown that this reaction has not lived up to the expectations of its possibilities. It is true that it may be present in pancreatic disease, but it may also be present with a perfectly normal pancreas; and one writer goes so far as to state that "not only is it useless, but it is harmful as well." It seems to us that the Cammidge reaction can be likened to the guess as to the sex of the unborn child; in 50 per cent. it certainly will be correct. Furthermore, it is a difficult test to perform, and one which requires a constancy of technique possible only when the same person is doing the reaction on a large series of cases. It is our opinion, and, we think that of most workers with the Cammidge test, that it be excluded, since the testimony derived from its performance is hardly of sufficient value to justify the difficulties of its execution. Other than the presence of sugar and the Cammidge reaction, we know of no other definite evidence in the urine which may aid in the diagnosis.

The feces, however, present certain characteristics of such a striking nature as to offer the most salient points in diagnosis. Large voluminous stools, in great excess over normal, are an almost constant feature. Usually the stools present a characteristic appearance: solid, greyish-yellow, and showing grossly an excess of fat. The increase in total amount of stool, and especially the presence of large amounts of fat, when, as often occurs, the fat is present as a large lump of butter, are seen practically in no other condition. Grossly, but especially microscopically, the stools may show a large amount of undigested muscle fibres.

Chemical experiments on patients with pancreatic disease show other interesting phenomena. By careful dietary regulations it can easily be

proved that the absorption of fat and of protein are greatly diminished. This is done by giving the patient known amounts of fat and of protein, and measuring the total excretion of these substances in the feces. Owing to the absence of the pancreatic lipase and trypsin, it will be found that a tremendously large percentage of ingested fat and protein are passed with the feces. There will also be found a change in the normal ratio of excretion of neutral fat, fatty acids, and soaps.

The Sahli glutoid capsule and the Schmidt nucleus test have also been extensively used. The glutoid test must be performed under restrictions which render it probably less valuable than the easily performed Schmidt test, so the latter only will be discussed. This is based on the absence from the intestine of a ferment capable of digesting cell nuclei. Small balls of hardened meat are tied in a gauze bag and fed the patient. The corresponding stools, which can be marked off by charcoal tablets, are then searched for the meat-balls, which are then cut and stained. In the absence of pancreatic juice the nuclei will be found unaltered. This test, too, has met with opposition and hardly adds enough to the evidence to be considered specific. Mere mention only need be made of trypsin determinations in stool and urine. At present the technique of these reactions is not clear enough to warrant their general adoption.

OPINION AND CRITICISM.

DARWINIANA AND BACILLUS COLI.

The conception of bacteria as regulators of population in the strictly Darwinian sense is one to which we cannot subscribe with much enthusiasm. We know how frequently it is said that tuberculosis is a disease which attacks and kills the weaklings in a community because the tubercle bacillus is an appointed regulator of population; but we deny the absolute truth of such a statement. To our mind, invasion by the tubercle bacillus depends on a subtle, unknown quantity called, in our ignorance, resistance, and it may attack not only the apparently weak, but also those who seem to be in prime condition. To say that apparently healthy persons become victims to tuberculosis because they are fundamentally weak is simply arguing in a circle, and is as absurd as saying that the moon shines only at night-time because we see it only at that time. If we believe in the theory of the survival of the fittest and supplement our belief by faith in the ability of the tubercle bacillus to pick out by natural selection those who are unfit to survive, all our attempts at eradicating the disease would be, to say the least, pardoxical.

Just as paradoxical it seems to us are the arguments of Morris to prove that the colon bacillus is a regulator of population. We read his article with much interest, and cannot contest the facts in the case. The colon bacillus is ubiquitous, it *does* produce almost any disease anywhere, even though it may sound fantastic and difficult to believe that appendectomy can cure choroiditis (Morris). But records of bacteriological laboratories show that other organisms are ubiquitous. The pneumococcus produces pneumonia, endocarditis, arthritis, peritonitis, conjunctivitis, etc. etc., and if perhaps the same range of activities is not attained by it as by the colon bacillus, its raids are more dangerous.

Can the ravages of pneumonia be looked upon as an effort of Nature to poison off excess of population? It would indeed make sceptics of us all were we forced to believe that Nature were so vicious in her choice of whom to kill off. Morris says "there are many bacteria, insidious in their methods of attack, still conducting Nature's plan of poisoning off excess of population and attacking most freely individuals who carry heels of Achilles after passing the higher stages of development in the family . . . the colon bacillus group of bacteria stands among the most active malefactors." Among the probable results of the malicious activities of this assassin, Morris mentions adhesions around pylorus or duodenum; gastric ulcer; pancreatitis; cirrhosis of the liver; arteriosclerosis; neurasthenia; indicanuria; pernicious anemia or its counterpart; kidney infections; pneumonia; infections of the female genitalia; and choroiditis!

Medical philosophy is interesting reading, but is a far different story from medical science. We remember hearing a scientist (?) make the claim of diagnosing influenza meningitis by his knowledge of the philosophy of medicine! We like to pass time reading theories, but when we have finished our reading, we always recall an article which appeared sometime ago on the relation of theory to fact. The theory is worth zero, the fact is worth one, when the two fit the whole is worth ten. When one recalls all the experimental work Darwin did before he talked, one feels the necessity of ingesting a large grain of salt with some modern theories.

LITERARY NOTES.

The modern interpretation of prostitution and what the awakening of the public conscience might do to rob this evil of its most degrading features are the salient points of Jane Addams' "A New Conscience and an Ancient Evil" (The Macmillan Company, New York). If, as has so often been said, sanity in the presentation of a subject is its best asset, then this book is of exceeding merit, for not only is its tone measured and restrained, but its optimism is of the sort that only arises when a writer has envisaged a subject with the patience that is closely associated with soberness of thought and the quiet admission of a disbelief in ideal social perfectibility. But though Miss Addams does not reach out for any chimeras that may solve the very intricate problem of prostitution, she has a good deal to say and, moreover, says it better than if some reformer of foolish fancies and flamboyant words, the sort that is constantly with us at the present time, had put his thought on paper in the hope of convincing us that the whole matter could be easily settled were we but to adopt his Utopian ideas. What are the causes of prostitution? Are they economic? or are they due to ignorance, to disgrace which must be hidden, to love of finery, to man's machinations which, as we know to-day, are a network with no loophole of escape—the white slave traffic? These are the subjects Miss Addams handles with ungloved hands, and especially are her hands unencumbered when dealing with the last and probably the most serious cause. That the white slave traffic is peculiar to this country is obvious to every student of prostitution as it obtains in all countries; and though we look askance at what we see in the streets of European cities, and give forth virtuous gasps when we learn of the number of prostitutes that each of these cities holds, we should not forget that, on account of the commercial spirit which we foster in all walks of life, a slavery is at our doors, which no European country would tolerate for a moment. Laxity of law, the lowest sort of politician, the procurer of influence and money, abetted by public indifference, are behind the millions involved in this business. To crush this upas is the object of "the new conscience"; and, since our legislators have shown their inability to cope with this problem, is it not possible that so soon as Equal Suffrage obtains this social wrong will be abolished? At least Miss Addams thinks so.

In "Elsie Lindtner" by Karin Michaëlis (John Lane Company, New York), the sequel to "The Dangerous Age" which was widely read on its appearance last year, the reader will find all the earmarks of the earlier novel. Here again is a study in hysteria as conceived by a novelistic mind that has become interpenetrated by the theories afloat to-day; and, though the writer may be criticized on the score of not being an adept in medicine, her cunning is of the sort that stands her in good stead in the matter of the portrayal of a woman whose every act is stamped with indecision. This book, just as was the case when its predecessor was published, cannot be thoroughly understood save by the medical man, a fact which is not against the book, but a tribute to the writer that her manner of handling a certain phase of hysteria is really well worth studying. Whether or not subjects that are purely medical should be exploited in novels is a matter of individual opinion; but, even though we may not be enthusiastic advocates, we must admit that the times are ripe for just this sort of book, for the subject of hysteria is "in the air," so to speak, and the laity discourse on it just as unlearnedly to-day and just as much as a former generation, assisted by quite a number of reputable physicians, "talked" on that great American disease—dyspepsia. Modern thought must have its way; and, so long as we are tolerant of portraits such as Ibsen's Nora and Strindberg's Julia, it would be churlish in us to denounce Mme. Michaëlis's Elsie Lindtner just because the writer's ideas of hysteria conform too audaciously with what Freud and others have taught us.

———

If the American reader would like to have an excellent illustration of what is really meant, when perspicacious medical critics deplore the lack of literary grace and the true essence of culture in the papers prepared for our journals by native writers, by comparison with what is accomplished in Europe, no better example is at hand at the present writing than Dr. F. G. Crookshank's "Essays and Clinical Studies" (H. K. Lewis, London). Here are so many exceptionally good qualities that to cite them in detail would not only bore the reader, but make the present critic out to be one who is given fulsome praise. But this much can be said on behalf of Dr. Crookshank's book, without inviting the charge of overpraise, that every general practitioner can derive considerable profit from a close reading of its contents. Now, when we advise this, we are excluding all American medical men who are so deeply immersed in German medical literature that when anything American or Anglo-Saxon, in the way of a book, swims within their ken they consider the reading thereof a waste of time, since being scientific (?) they prefer technicalities to what the unspoiled Anglo-Saxon mind calls "meat" in a book. The "meat" in Dr. Crookshank's book is of the healthy English sort, and when, as it is in this instance, garnished with a sanity of presentation and a literary style that is commendable, the reader of the sort we have in mind should be content. Of course, it must be understood that an essay is a summing up of "situations" previously examined and expounded by various writers, and not an original thesis; hence, to demand of a book that carries the title of "Essays" more than it is supposed to give, is a criticism that makes for captiousness.

ORIGINAL ARTICLES.

THE INJECTION OF OXYGEN AND OTHER DISINFECTANTS INTO THE INTESTINES THROUGH THE DUODENAL TUBE.

By Prof. Adolf Schmidt, M. D., of Halle,
Professor of Clinical Medicine in the University of Halle, Germany.

The method of the direct introduction of the soft tube through the stomach into the duodenum is a creation of American physicians, the diagnostic importance of which is now placed beyond all doubt, but which also promises valuable therapeutic results. The experiments of Hemmeter, Kuehn, and Fenton B. Turck, in entering the duodenum with an elastic tube, gave the foundation on which Einhorn and Gross afterwards based their method of introducing, automatically, thin rubber tubes by the act of swallowing and the peristaltic movement of the bowels. The great advantage of this procedure consists in the fact that the distress inflicted on the patient is, relatively speaking, small. The small open capsule, fitted to the end of the thin rubber tube, is swallowed immediately after breakfast, and glides without further trouble into the stomach. During the digestion of breakfast it passes as a rule through the pylorus into the duodenum, especially if the patient afterwards drinks a little water from time to time; and the tube follows in the same way. When the tube has descended to a length of 70 cm., which happens after about an hour and a half, it will be possible, by means of the suction-pump at the free end, to withdraw part of the contents of the stomach, to introduce nourishment, or to inject drugs for therapeutic purposes, according to the object in view.

The last mentioned method—by which is meant the application of drugs to the duodenum, and also to the small intestines—has up till now been very little employed. Gross, it is true, has already effected the cleansing of the upper part of the intestines, but whether he has also introduced alterative substances in this way, the writer does not know. Not long ago, the writer reported experiments which aim at influencing the process of decomposition in the small intestines by inflating them with oxygen, and which, as far as he can judge at present, are full of promise. In making these experiments he started from the assumption that the pathological accretions of bacteria in the intestines, like the ordinary intestinal parasites, must develop without oxygen, since, as is well known,

the O_2 which reaches the stomach with the air swallowed is mostly re-absorbed within the stomach itself. Experiments made by Rotky in the writer's clinic have shown that oxygen is only passed on into the small intestine when it is artificially introduced in a pure state into the stomach. The conclusion inevitably follows that pure oxygen in the interior of the intestine will influence detrimentally the vital activity of the intestinal bacteria, especially those of the anoxygenic kind; and it is quite possible that morbid processes of decomposition may be arrested in this way. Hitherto, experiments of this kind have only been conducted in the large intestine by introducing gas *per anum*. Segel reports surprisingly favorable results attained in this way in cases of chronic diarrhea, while Salomon merely studied the absorption of the O_2 by the inner surface of the intestine.

As to the absorption of the O_2, this, without doubt, takes place in the intestinal tube very much more slowly than that of the CO_2. Kato has already proved this by experiments in the writer's clinic. While 90 per cent. of the CO_2 had already disappeared within ten minutes, the quantity of the O_2 introduced is diminished during the same time by only 3-4 per cent. It seems probable that the intestine is not constituted for the absorption of the O_2. Accordingly, when inflating oxygen into the human body, the writer has constantly observed that the oxygen is again discharged, in the course of the next few hours, in the form of odorless gas through the anus. This being so, the question is, whether the oxygen is entirely without effect on the mucous membrane. Even though, as a rule, patients experience no sort of unpleasant sensation, nevertheless the writer does not think that the oxygen is wholly without irritant effect. In certain cases, at any rate, even with quite healthy persons, the writer has seen slight diarrhea produced by the inflation of oxygen. Hence the necessity, in morbid conditions, of exercising care in the introduction of the oxygen, and, if it should seem advisable, of diluting it with ordinary air.

With regard to the therapeutic effect, the writer's experience extends, so far, only to dyspeptic conditions and catarrhs. In some cases, especially in conditions involving the fermentation of carbohydrates, the treatment had a surprisingly favorable influence. After only a few inflations, he was able to establish the disappearance of starch-bacteria from the feces. In other cases the success was less marked, and did not appear until the treatment had been interrupted after a series of inflations. It seemed as if the slight irritation of the intestine by the O_2 had at first disguised the immediate effect. On the whole, however, he has no doubt that the inflation of oxygen is a valuable addition to our therapeutic methods, especially as we must admit that hitherto our means of disinfecting the intestines has been singularly poor in results.

As to the technique of inflation the following points have to be observed. The writer employs very narrow, though stout tubes, the inner

diameter of which is only 2 mm. After removing the clamp from the free end of the tube, the operator should clear the passage by blowing into it, as there is often obstruction from mucus or chymus. Then a steel bottle filled with oxygen and provided with a reducing valve is attached, and the gas is allowed to enter very slowly. By placing the ear over the region of the stomach, the gas-bubbles may be heard rising, and one must then wait until a distinct swelling of the single parts of the stomach follow the introduction of the gas. If the head of the tube has not penetrated far enough into the duodenum, part of the gas returns into the stomach, and the operation must then be broken off until the gas has by degrees discharged itself spontaneously into the intestines. When this is not the case, four litres or more may be introduced into the small intestines, without causing the patient any feeling of distention. As soon as this appears, the operation must be brought to an end, the tube withdrawn, and the patient allowed some time for respose. In the course of a few hours or at the most of half a day, the gas will be discharged by flatus. So far, the writer has only employed this method once or twice a day, but he considers it allowable to repeat it several times, and in some cases the tube may remain in its place for some days, as it does in case of nutrition through the duodenum.

The writer does not believe that oxygen can be introduced into the small intestines through the anus in the same quantities, without causing great distress to the patient, and incurring the risk of forcing the gas by excessive pressure into the intestinal capillaries and producing embolism of the lungs. That the possibility of this is actually present, the writer has convinced himself by experiments on animals. As a rule, Bauhin's valve is closed, even for gas clysters, so long as the pressure remains low.

Of course, the inflations may be made with other gases also, but so far the writer has had no occasion to employ them. As regards the employment of Roentgen rays in cases of stenosis, this method of procedure may be found useful.

As to the introduction of considerable quantities of water for the purpose of cleansing the intestines, or of chemical solutions for disinfecting the smaller intestines, at present the writer's experience does not enable him to pronounce an opinion. Nevertheless, the experiments on which he is engaged at present are being prosecuted in the hope of furthering our methods in this direction.

FALLACIES IN THE TREATMENT OF GASTRO-INTESTINAL DISEASES.

By Isaac A. Abt, M. D., of Chicago.

No group of diseases in the whole domain of medicine has been less understood than the gastro-intestinal diseases of infancy. They have been wafted about in the sea of medical thought in a rudderless boat and have scarcely ever been safely in port. One hypothesis after another has been suggested for their etiology. The classifications have been as numerous as the schools which made them, and the treatment has been as empirical, unfounded and variable as the changing opinions concerning their etiology and pathology.

It would be premature at this writing to attempt to offer a final solution as to the nature or treatment of these cases, but a careful study of case histories collected over an extended period of time would enable even the casual observer to make deductions from the fallacies which have taken place in the interpretation and the treatment of these disorders. We have only to refer to the treatment which was in vogue during that period when the bacteriological or infectious theory of infantile gastro-intestinal diseases dominated the profession. The antiseptic drugs from the beginning to the end of the alphabet were employed. They were dropped one after another because it was soon demonstrated that antiseptic treatment of the gastro-intestinal tract was impossible. It was learned, too, after long years of bacteriological research that no specific micro-organism (in most instances) could be discovered as the causal factor in the production of digestive disturbances. It would lead too far at this point to discuss the newer thought concerning the nature of these diseases, but, in a word, we must conceive that in large part this group of affections depends first of all upon a disproportion between the food and the ability of the child to digest; consequently a functional derangement or an indigestion; secondly, upon perversions of the normal chemistry of digestion in the gastro-intestinal tract with the formation of products which are foreign to the normal physiological processes; thirdly, upon nutritional disturbances which take place outside of the digestive tract in the intermediary metabolism and which may lead to disturbances of growth or development in the milder cases, or to severe constitutional symptoms such as fever, rapid superficial breathing, coma, alimentary glycosuria and albuminuria in the severer cases.

Every student of this disease-group will concede that the dysenterys may be primary infections. Secondary infections may develop in those

cases which begin as functional perversions of digestion. Thus it is possible that a so-called dyspepsia may terminate as an infective colitis or dysentery.

Cathartics.—It has been the custom, founded upon long usage, to treat the gastro-intestinal disorders of infancy by the use of cathartic drugs. It is not the purpose of this paper to decry the use of laxatives in infantile therapeutics. It is, however, desirable to point out the abuses which are practised in the administration of these remedies. The writer has become convinced from clinical observation that the long continued use of laxatives may be irritant, and possibly change a mild dyspepsia into a severe lesion, or protract a disease process which has already been established. Laxatives have their therapeutic limitations. How frequently one hears the attending physician say, "the patient is being thoroughly cleaned out." It would seem only a rational reflection that if satisfactory evacuations have taken place, no more cleaning out is possible. Surely the long continued cathartics will not remove abnormal epithelial cells, nor will they regenerate by such a plan of treatment. There is a popular fallacy among physicians and laymen alike, that the presence of mucus in the stools is an indication for the administration of more cathartics, because they argue, if there is mucus present it must be evacuated. Do they stop to reflect that possibly the mucus is being produced by the irritating effects of the cathartic drugs? How often has the writer seen children with mucous stools, with loss in weight and colic, show improvement when the cathartic drug was discontinued and a rational diet was substituted!

By a series of experiments which were undertaken under the writer's direction several years ago, at the Michael Reese Hospital in Chicago, it was shown conclusively that the stools of normal children could be rendered abnormal by the use of laxatives. It was possible to produce diarrhea and also mucous stools, where none had previously existed; and chemical tests showed traces of blood in most of the cases. It was shown that calomel was the most irritating, saturated solution of magnesium sulphate in dram doses given for three successive days to infants of one year slightly less irritating than calomel, and castor oil in one teaspoonful doses the least irritating of all.

The conclusions are obvious. It was possible to produce distinct irritation of the gastro-intestinal tract by giving laxatives to normal children. Can we estimate the harm that is being done by giving long-continued doses of laxative drugs to children who are already ill?

An infant, six months of age, who had received a cathartic drug in some form nearly every day since birth, was recently brought to the writer. For the first few weeks of life, castor oil in teaspoonful doses with small doses of calomel was given every other day. Later on, when the child was enfeebled from prolonged diarrhea and every plan of feeding was unsuccessful, calomel was being administered in doses, varying

from 3/10 to 2 gr. daily, for weeks. The stools were composed largely of mucus. The child was in a state of almost complete digestive insufficiency. All cathartics were withdrawn, and small quantities of diluted breast milk were administered at short intervals. The infant held his own, but progress was extremely slow. Food was tolerated only in small quantities, and after nine weeks of treatment this child remains in a state of malnutrition.

The writer recently saw a little patient, of four years, who was taken ill about ten days previously with a tonsillar affection and some slight cervical adenopathy. The physician in charge began treatment by a cleaning-out process with one grain of calomel per day, and continued the administration of this remedy until the writer saw the patient on the tenth day. The child had a moderate, though a constant temperature; there was a distinct fetor from the breath, the gums were swollen, soft, and spongy, bled readily and overhung the teeth. Aphthous ulcers were numerous in the mouth. It was only necessary to stop the calomel and to treat the mucous membrane with astringent remedies to effect a cure in a few days.

These cases are only illustrative; many others might be cited. The writer thinks there are many physicians who are in a position to corroborate his experience. Most cases of gastro-intestinal disease would make a more prompt recovery if the laxatives were simply used as an initial dose and discontinued when the desired effect was produced.

In a recent number of the *Wiener klin. Wochenschrift,* Jaworski calls attention to the production of heart weakness after purging. He points out that the loss of fluids in the diarrheic stools is not the only cause, but the purge also induces hyperemia and congestion in the abdominal organs; as a result, the blood is drained away from the skin, muscles and brain, and the heart does not have enough blood to pump against. In well-marked cases, particularly in those where there is myocardial weakness, the external temperature declines and the skin is cool and pale from the more or less general weakness. Dizziness, small soft pulse, and feeble apex beat with diminished cardiac tones and arrhythmia are frequently observed. While this condition may occur with greater frequency among the aged with arterial sclerosis and myocardial degeneration, it applies equally in those who are suffering from acute infectious diseases, and certainly should be thought of in the treatment of young infants, enfeebled by disease or vices of nutrition. There are no accurate observations at hand as to the constitutional enfeeblement produced by excessive use of cathartics in infants and children. If a diligent search were made, clinical data undoubtedly would be sufficient to support this view.

Starvation.—Another point in the treatment of the infantile group of gastro-intestinal diseases refers to the withdrawal of food. It has become an established custom to take away the baby's food when he is

suffering from diarrhea or vomiting, or fever. It must be conceded that within limitations this is proper and effective treatment. To deprive a baby of milk, until the gastro-intestinal tract is capable of digesting it, is a rational procedure. But for how long a period can an infant be kept, with safety, on a water, tea or cereal water diet?

It is a common observation, well known to every practitioner, that an infant kept on a starvation diet, loses in weight. Sometimes the loss is precipitate. This has been well studied in cases of pyloric stenosis. Inanition is almost complete in the severe cases and loss of weight is rapid and progressive. It is an observation which is easily proved that infants and young children bear deprivation of food badly as compared to adults. The rapidly growing organism is in greater need of food for active metabolic processes than are older individuals.

The normal child, who is deprived of food, shows usually a slight reduction of temperature, diminution in respiration, and a decrease in the number of pulse-beats. The skin loses its normal resillience; and, as the starvation continues, the skin over the thigh and abdomen comes to lie loosely in folds; the eyes are sunken and the fontanelle slightly depressed. The abdomen sinks in, the muscular tonus is relaxed or in some cases may be hypertonic. The psychic state varies; some infants are markedly restless and cry after they are given food, and sleep little. Young infants are drowsy, take the breast reluctantly and frequently fall into a deep sleep. Constipation is the rule, though sometimes blood occurs in the stool due to duodenal ulcers resulting from prolonged inanition.

Such infants show a diminished resistance against infection. This fact has been shown experimentally in animals and proved clinically in infants. Those, who are being deprived of food, readily fall prey to bronchopneumonia, furunculosis, pyelitis and other infections. It has been shown, too, that infants, who suffered from starvation for a considerable time and were subsequently fed liberally, showed a diminished tolerance for food. It has been demonstrated in animals, who have been starved and then fed, that they frequently died. For example, it is known that the tolerance for sugar is diminished by starvation. A well-nourished dog would ordinarily show no glycosuria if fed a reasonable amount of sugar; a dog, after having been starved, would show glycosuria after having ingested a minimal amount of sugar. This is thought to be due to a diminished assimilation of the carbohydrate. It has also been shown by von Noorden that an individual, who has been starved for three days and then given one or more raw eggs, would show an abundance of albumin in the urine.

This serves to demonstrate that even after a short period of starvation, the organism loses the ability properly to dispose of ingested food. It suggests, too, that in infants, after a longer or shorter starvation period, foods become increasingly difficult to digest, and that feeding is more difficult the longer the period of starvation. Consequently the tolerance for food is diminished.

It has been pointed out that an infant who loses 25 per cent. of his body weight is in a precarious condition so far as his recovery is concerned.

Infants are frequently starved owing to a mistaken diagnosis. How frequently one sees an infant ill with an otitis media, a cystitis or pyelitis, or even a tuberculosis, deprived of food under the mistaken assumption that he is suffering from a gastro-intestinal disorder and therefore requires a complete reduction in diet.

A case illustrating this point recently came to the writer's notice. A female infant of eighteen months, who had suffered from gastro-intestinal disturbances, was given large quantities of cathartics and quinine and fed nothing but chicken broth for five weeks. When first seen the child was restless and fretful, alarmingly emaciated, and had continuous temperature of 100 to 101° F. Thin mucous stools, probably the result of long continued laxative treatment, were of frequent daily occurrence. The examination of the urine showed a trace of albumin, and the microscopic field swarmed with leucocytes. An abundance of water, one grain doses of urotropin, and a diet, consisting of cereals, animal broths with vegetables boiled in, toast, zwieback and crackers, beef juice, and a proprietary food as a substitute for milk, was given. Later on baked potato, carrots and spinach were added. The baby improved in weight and general health in a very brief time.

The period of starvation should be short, not longer than eighteen to twenty-four hours. It is not always possible to cover at once the caloric requirements of the patient. Indeed, underfeeding in acute illness is not equivalent to starvation; and it is obvious that if a child, recovering from an acute illness, is given a quantity of food which he could consume in health, this would be irrational and would constitute overfeeding.

Young patients, recovering from gastro-intestinal disease, should be kept warm so as to maintain bodily heat, should receive an abundance of water; sometimes a small quantity of salt should be added, and alcohol in some form may be administered on account of the readiness with which it is oxidized.

One of the casein-containing preparations, such as nutrose or plasmon, may be used. As a rule these preparations are well taken care of even in the severest cases.

The cereal waters, or gruels for older children, may be employed, with the addition of a maltodextrin preparation such as *Nahrzucker*, which is in vogue in Germany at this time. Milk sugar and cane sugar should be added, cautiously if at all, as they tend to produce more readily diarrhea, fermentation and intoxication. It is advisable, when beginning the use of milk, especially in the severe cases, to employ small quantities of diluted fat-free or separated milk, which has been previously boiled. The boiling facilitates digestion and prevents the occurrence of curds.

Recent reports from Finkelstein and Meyer would tend to discredit the

use of whey. They believe that its food value is minimal and that it is toxic, particularly when gastro-intestinal derangement has previously occurred. Buttermilk, either raw or boiled, sometimes renders signal service in tiding the infant over from the period of starvation to that of carefully regulated feeding. Soy-bean flour water, introduced by Dr. John Ruhrah, of Baltimore, is useful on account of its high proteid value and the fact that it seldom produces unfavorable symptoms.

The albumin milk of Finkelstein, made by preparing the junket of milk and adding the same to equal quantities of water and buttermilk, has frequently given brilliant results in the hands of those who understood how to prepare it and the details of its administration.

Breast milk, in the more severe cases is the food *par excellence*. A word may be said, however, in this connection. Those patients recovering from severe gastro-intestinal disorders should not be placed on the breast and allowed to drink at will. Small quantities should be given at short intervals. While the writer is impressed with the fact that in health, infants should receive feedings at three- or four-hour intervals, preferably five feedings a day, or under some circumstances six, he is equally imbued with the fact that sick infants, those suffering or recovering from gastro-intestinal disease, should be fed small quantities at short intervals. This applies with equal force to skimmed milk, buttermilk, albumin milk and breast milk.

Kellar has recently called attention to a condition which he designates the reparition period. This period represents that time, which elapses during a digestive disturbance before an infant begins to show gain in weight. During this period the patient is digesting his food, the previous fretfulness disappears, he becomes bright and happy. He shows distinct improvement, though several weeks may elapse before an increase in weight takes place. This period is one of reconstruction and repair. Overfeeding should be avoided. The infant, at this time, may be deluged with food, even with breast milk; and his process of digestion and assimilation so far overtaxed that he is incapable of carrying on the necessary physiological processes. The result is that indigestion with diarrhea and the sudden occurrence of severe constitutional disturbances may precipitate the end.

The reparation period, then, is one of reconstruction and repair with a stationary weight curve. Overfeeding during this period is as pernicious as starvation, and it may result in disaster.

INFANT FEEDING AS TAUGHT BY THE GERMAN SCHOOL.

By Jules M. Brady, B. S., M. D., of St. Louis,

Assistant Professor, Diseases of Children, St. Louis University.

More than thirty years ago Jacobi in this country recommended that the newborn infant be fed cow's milk diluted with four to five parts of barley water with the addition of cane sugar, a tablespoonful to a quart of the mixture; the proportion of milk was gradually increased with the age of the baby until at six months equal parts were fed. This diet, as we all know, suffices for many infants; there are many, however, who do not thrive on this mixture.

In 1892, Rotch established a milk laboratory in Boston, so as to make possible the scientific feeding of infants. He believed that the green and curdy stools, so frequently met with in infants who are not thriving, were due primarily to a failure to digest the proteids of cow's milk. We are all familiar with his percentage method of feeding and the various means resorted to in order to overcome the difficulty with the proteids. Until recently his teaching was enthusiastically indorsed by Holt and Morse in this country; abroad Filatow, Monti, and Biedert were of the same opinion.

Biedert said the masses in the stool were casein because of their gross appearance, because they gave the Millon and biuret reactions, and because of their nitrogen content.

The work of Escherich, Czerny, Keller, Finkelstein and Meyer has completely overthrown this doctrine, which for many years occupied the first place in this difficult field. To-day we can say that the proteids of cow's milk are not toxic and are not indigestible. No nutritional disturbance is recognized which is traceable to the proteids. Therefore, peptonization, the addition of citrate of soda and lime water, the addition of cereals, the use of whey in the milk mixture, if resorted to with a view of rendering the casein of cow's milk more digestible, must be branded as unscientific.

Tobler is quoted by Meara as saying: "Pediatrics has trodden a remarkable path. For the past ten years it has led the struggle with every means at its command against rennin in the infant's stomach, whose only function many writers look upon as that of doing injury to the digestive tract. According to them the child had better come into the world without any rennin ferment. For years the sum total of infant dietetics was the prevention of the physiological curding. Since the teaching of the indigestibility of cow's casein has fallen to the ground, the chief argu-

ment for the procedure has become illusory. The last theoretical prop
has now fallen. We no longer have any ground whatsoever for finding
the idea of cow's milk curding in the stomach, as it does in a test-tube,
as almost terrifying."

In regard to the reasons for believing that cow's casein is not indi-
gestible, Langstein has demonstrated that, after a feeding of cow's milk
and one of woman's milk, the same amounts of peptone and albumoses
are found in the stomach contents. Furthermore, infants fed on cow's
milk which is rich in nitrogen, and woman's milk which contains but little,
show about the same amount of nitrogen in the stools. Meyer, in
Finkelstein's clinic, gave sick children woman's whey plus cow's casein
and cow's fat, on which they thrived; on the other hand, he gave them
cow's whey plus woman's casein and woman's fat, on which they failed
to thrive; from which he deducted that cow's casein cannot be the in-
jurious factor in artificial feeding. Finally, the beneficial effects derived
from feeding sick infants *eiweiss milch,* a milk very rich in casein, has
been sufficient to convince the most sceptical.

Why then do not all infants thrive on cow's milk? To begin with,
there is a biological difference between mother's milk and cow's milk;
cow's milk was intended for the calf, and students of the problem never
expect to be able to humanize cow's milk.

It has long been observed how differently various infants react to the
same food. For instance, one baby will do beautifully on one food that
for another infant utterly fails to suffice; in fact, may even induce illness.
This is explained by Czerny as owing to constitutional taints. Children
who have inherited the exudative diathesis, depending on the degree,
offer difficulties in their proper nutrition. The slightest change in the
routine of the daily life of the infant is sufficient to cause a disturbance.
If not constantly watched and the greatest care given, nutritional dis-
turbances rapidly develop. A second class is the neuropathic babies, the
offspring of highly nervous parents. This group is even more difficult
to handle than the preceding one. Czerny believes that most of the
children seen in clinics and institutions with whom unsatisfactory results
are obtained belong to this class. He believes that this type contributes
largely to the high death-rate amongst infants. A third is the hydropic
constitution in which there is a difference when compared with the normal
child in the relation of salt and water in the tissues. This bond is very
weak, and as a result there is a wide variation in the water content of the
body as a result of a slight nutritional disturbance. Therefore, we fre-
quently meet with marked and sudden changes in the body weight. · This
knowledge enables us to explain many of our perplexing cases met with
in practice.

It was long thought that much of our difficulty met with in feeding
infants was due to a lack of development of the digestive functions.
Now we know that the newborn infant is plentifully supplied with all the

digestive ferments. As early as the fourth month of fetal life a diastatic ferment is present in the parotid gland. The substance, secretin, first described by Starling, and placed by him in the group of "hormones," is found even in the newborn. Its mother substance, prosecretin present in the mucous membrane of the duodenum, is activated by the action of the hydrochloric acid of the gastric juice, and absorbed into the blood. Through the blood it reaches the pancreas which it incites to activity. The tryptic, diastatic, and lyptic ferments have all been found in the newborn. Czerny and Keller state that all the ferments of the intestinal canal are present in infants; and Uffenheim says that there exists from the earliest life the possibility of the breaking down of starches, milk sugar, cane sugar, and maltose. Therefore, the uselessness of administering to the infant various digestive mixtures, with a view of promoting the nutrition, is apparent.

While the proteid of cow's milk is considered harmless, the same cannot be said in regard to the fats, sugars, and salts. The fat in the food in a high percentage, or in a susceptible infant only moderate in amount, is capable of bringing about a definite nutritional disturbance. This is known as milk nutritional disturbance (*milchnaehrschaden*) and has a clearcut symptom-complex. The weight is stationary or may show a slight loss in spite of the fact that sufficient calories have been ingested. The temperature shows a daily fluctuation of one or two degrees with a tendency toward subnormal. The stools show characteristic changes; they are dry, light in color (gray to white), friable, and do not soil the napkin. This is the fat soap stool. The skin is pale, muscles flabby, abdomen distended, and the baby is very cross and fretful. The fat soap stools are an indication that an excess of fatty acids have been combined with calcium and magnesium. The failure to gain in weight is supposed to be closely associated with the excessive waste of calcium and magnesium through the bowel. Normally, 18 per cent. of the total fat constituent of the stool consists of the insoluble calcium and magnesium soaps, whereas in this condition about 45 per cent. is insoluble calcium and magnesium soaps. Therefore we see, as the result of the ingestion of the fat of cow's milk, an excessive amount of earthy alkali lost through the stools. An important accompaniment of the condition is an acidosis manifested by the presence in the blood and urine of acetone, diacetic acid and oxybutyric acid. Owing to the fact that top milk mixtures have been very popular in this country, this condition is frequently met with.

Malt Soup.—This nutritional disturbance is very frequently cured by malt soup prepared with extract of malt, flour, carbonate of potash and cow's milk. The writer has used it extensively for the past five years in the feeding of infants over three months of age, who respond almost invariably to the therapy.

The abnormal appetite is appeased, the restlessness is quieted, and the infant becomes much happier. The soap stools rapidly clear up and take

a soft, moist, mahogany-brown, salve-like consistency. The body weight starts upward, the gain averaging usually from four to seven ounces a week.

This diet cures owing to the high percentage of maltose and the low fat percentage. The carbonate of potash is added to overcome the acidosis which is so frequently present. For infants under three months breast milk, or *eiweiss milch,* is indicated.

In view of the fact that it is clearly established that the above condition may arise as the result of feeding a large amount of fat, it is advisable, in the early weeks, to prescribe a low percentage of fat or even a fat-free diet; and as the weight increases the fat may be increased. 3 to 3.50 per cent. should not be exceeded throughout the first year. A tendency to lose weight or failure to gain is an indication for diminishing the fat and increasing the carbohydrates.

Rôle of Lactose.—For years the adjustment of the carbohydrate percentage to the needs of the infant was considered simple, and seldom thought to be accompanied by any morbid symptoms. Now we know that in a susceptible infant, or one with a pathological condition of the intestinal epithelium as the result of the administration of lactose, a definite symptom-complex may arise. This is the "Alimentary Intoxication" of Finkelstein, the symptoms of which subside immediately on withdrawing the sugar from the diet. The recognition of the true cause of this syndrome allows us to interpret correctly the nature of enterocolitis and summer diarrhea. The writer would be the last one in the world to minimize the benefit derived from feeding a milk as free from bacteria as possible. However, the laity and many physicians believe that, given a milk free from bacteria, the liability of that particular infant developing diarrhea or green stools is eliminated. There is a well-defined group of infectious diarrheas which depend on bacteria. There is another much larger group of diarrheas which have absolutely nothing to do with bacteria in their etiology. The disturbance is a metabolic one; its prophylaxis and treatment consist in the proper adjustment primarily of the sugar, and secondarily of the fat in the diet.

Since the birth of bacteriology we have closely associated the development of a diarrhea in an infant with the invasion of the intestinal canal with bacteria. Experiments are at hand which prove conclusively that fever and loose stools can be caused by the food elements alone. The fact is not sufficiently appreciated that while we must first secure a clean milk, in prescribing that milk we must carefully consider the food tolerance for that individual infant.

We know now that cane sugar is better tolerated than milk sugar, and that maltose, which is always fed in combination with dextrin, is most easily burned in the body, owing to the fact that maltase, the ferment which splits dextrin up into its corresponding monosaccharids, is present in all the tissues.

Whey, owing to its high percentage of milk sugar and the concentration of its salts, has fallen into ill-repute. The writer's experience with it, which has been by no means small, has been very unsatisfactory. Great misapprehension exists as regards the stools; their chief constituent is the secretions from the intestinal canal. The sugar and proteid under normal conditions are almost completely absorbed, but fat in the shape of soaps, neutral fat and fatty acids are always found up to 4 and 5 per cent. even in the breast fed. The green color of dyspeptic stools is usually due to oxidation of bile constituents.

The intervals of feeding are of great importance and at variance with what we usually find recommended in this country. The coagulation of milk begins within two or three minutes after it reaches the stomach, and is completed in ten minutes. The whey passes immediately into the intestine and leaves the solid curd behind. The periphery of the curd is attacked by the gastric juice; after three hours, in the case of cow's milk, the stomach has emptied itself; in the case of mother's milk in one and a half to two hours. If milk is taken into the stomach before it has emptied itself, the later milk flows about the curd already present and forms layers around it. In this manner, if the milk is ingested regularly at short intervals, the nucleus of the curd would remain undigested indefinitely. Therefore, it is apparent that the intervals should not be less than three hours, particularly in the artificially fed. Czerny and Keller recommend five feedings in twenty-four hours even for young infants. The amount of each feeding must, however, be large—three and one-third ounces in the early weeks.

From what has already been said, we come to the conclusion that for a healthy infant, throughout the first year, the proteid percentage need not be small and may range from 1.50 to 3.00. Particular attention must be paid to the fat, and must be increased only when the infant is thriving; it should range between 1 and 3.50 per cent. Maltose, on account of its favorable effect on the weight, and the fact that it is less liable to bring about an intoxication, is to be preferred to lactose.

THE TECHNIQUE OF THE WASSERMANN REACTION FOR SYPHILIS.

By R. B. H. Gradwohl, M. D., of St. Louis.

A short article by Wassermann, Neisser and Bruck,* announcing that they had succeeded in utilizing the already known Bordet-Gengou complement-fixation-phenomenon as a means of making a serodiagnosis of syphilis, was the first intimation to a waiting medical public that at last had come a method which would promise a fairly accurate means of clinching the diagnosis of this widespread disease, in doubtful and uncertain instances. Since the original publication, a wealth of literature, a ton of experiences has been recorded, some orderly, some disorderly. Out of the sum of the experiences of many workers from 1906 to 1912, it is the writer's rather hazardous task to give a condensed review. Hazardous, he might repeat, because the amount of work done all over the civilized globe in this direction has been stupendous.

The Bordet-Gengou phenomenon of complement fixation depends upon the following conditions: First, if you inject a rabbit subcutaneously, intraperitoneally, or intravenously, with the corpuscles, washed thoroughly, of any animal such as a sheep, you will develop something in his blood which we call "amboceptor" (*substance sensibilitrice*) which is specific for the original corpuscles injected, *i. e.*, if you add to a certain amount of sheep corpuscles a certain amount of the rabbit immune serum, in the presence of "complement" (alexin) which is normally present in bloods, especially in guinea-pig blood, you will see the phenomenon of hemolysis which means a disintegration of the corpuscler architecture resulting in a clear transparent fluid where before the fluid was cloudy. It might be added here that amboceptor is a substance not changeable in its biological activities by exposure to heat. It is thermostabile when heated to 56° C. for half an hour. Complement, however, is destroyed by exposure to 56°C. for half an hour. It is thermolabile.

When we heat sera for purposes of destruction of complement, we call this step "inactivation." Any foreign albuminous substance which we inject into a rabbit, whether sheep or ox or human blood, or bacteria or what not, is known as an "antigen." This term is rather loosely used in our English medical literature. The combination of reagents to demonstrate hemolysis—namely, amboceptor, complement and corpuscles, we term a hemolytic system. If we inactivate blood-serum (amboceptor),

thereby destroying its complement, no hemolysis occurs in contact with the specific corpuscles. If we add to such a system a drop of guinea-pig serum, fresh, containing plenty of complement, then hemolysis proceeds rapidly.

The Wassermaan reaction worked out by Wassermann, Neisser and Bruck takes advantage of the fact that if you mix with a hemolytic system, blood-serum from a specific infectious disease, plus an antigen, that is to say, a solution of the micro-organisms causing that disease, these two bodies form a strong combination with complement, destroying or inhibiting its power to assist in hemolysis, so that the hemolytic system is

A POSITIVE REACTION.

True Syphilitic Serum

Complement guineapig serum

Antigen

Sheep Corpuscles

Amboceptor rabbit immune serum

{ Binding of Complement, Inhibition of Hemolysis, POSITIVE REACTION.

A NEGATIVE REACTION

Normal Serum

Antigen

Complement Guineapig Serum

Sheep Corpuscles

Amboceptor Rabbit immune serum
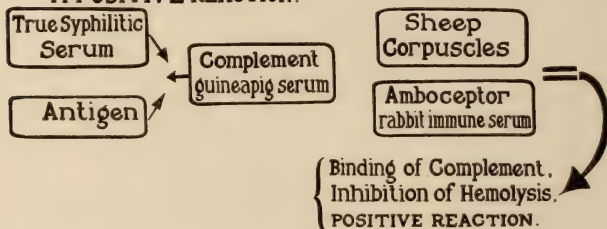
{ No binding of complement, Hemolysis, Negative REACTION.
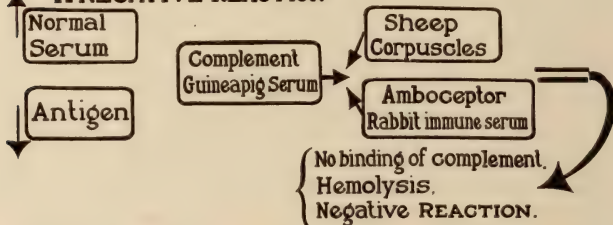
in much the same state as if you had inactivated the amboceptor or had forgotten to supply this inactivated ambocepter with guinea-pig serum. You will have no hemolysis accordingly. To illustrate this phenomenon of complement fixation:—

Cholera vibrio (representing an antigen) plus serum of choleraic patient (representing antibodies), plus guinea-pig serum, plus inactivated hemolytic amboceptor (sheep), plus sheep corpuscles, equals inhibition of hemolysis.

Applying this to the diagnosis of syphilis, if you mix the serum of a true syphilitic with an antigenic extract, plus complement (guinea-pig

serum), plus amboceptor, plus sheep corpuscles, you will get no hemolysis. If the blood-serum comes from a non-syphilitic individual, there is no binding of complement, the phenomenon of hemolysis ensues so that at the end of the technical procedure you will have a clear transparent reddish fluid. This is what we term a negative reaction.

Wassermann and his followers at first thought that this inhibition of hemolysis in this test was due to an actual combination between an antigenic extract, containing the true antigen derived from the bodies of spirochæta pallida from syphilitic liver in the presence of the antibodies derived from the syphilitic serum. Yet Porges and Meier in Berlin, Landsteiner in Vienna, Mueller and Poetzl, later Levaditi and Yamanouchi in Paris, as well as many others, have found that you will get the same complement-anchor-phenomenon whether you use luetic liver, normal liver from man or from many other animals. Furthermore, these investigators proved that this extract could be made up in alcoholic solution, not necessarily in watery solutions, as originally emphasized by Wassermann. Landsteiner, Mueller and Poetzl believed the particular antigenic power resided in lipoid substances, while Porges and Meier believed in the lecithin content of the alcoholic solutions as explanatory of the phenomenon. As a result of these investigations, Wassermann amended his first explanation of his reaction, speaking then of the specific substance found in syphilitic serum as a toxin, not an antibody, which could be bound with lecithin to complement. Fleischmann thereupon attempted to use cholesterin and vaseline as an antigenic extract: Sachs and Altmann tried sodium oleate; Levaditi and Yamanouchi tried taurocholic and glycocholic sodium combinations. These have not been uniformly successful in obtaining the specific reaction. It remained for Noguchi to work out the exact biochemistry of the substance found in human or other animal viscera, which bound complement in the presence of true syphilitic serum. He tried out the antigenic, anticomplementary and hemolytic properties of the alcoholic extracts of livers (human and otherwise) from various sources after fractionation by chemical means of such extracts. The substances insoluble in ether and hot alcohol are chiefly proteins and salts. The salts (chiefly sodium chloride) are neither markedly hemolytic nor anticomplementary, nor do they possess antigenic property for the Wassermann reaction. Since, however, the proteins bind complement when mixed with active human sera, a preparation of antigen containing these should not be used with an active serum. Substances insoluble in ether and soluble in hot alcohol include soaps, cleavage products of proteins and bile salts. The soaps and bile salts are strongly hemolytic and possess little antigenic value. They should, therefore, be eliminated from antigens for the Wassermann test. Substances soluble in ether, alcohol, and acetone include fatty acids, neutral fats, cholesterin and lipoids. They are anticomplementary and hemolytic. They vary much in amount in different preparations and, al-

though antigenic, are on this account undesirable as antigens. Substances insoluble in acetone include lecithin and phosphatids. The antigen should therefore be selected from this fraction. Further, Noguchi has shown that a high antigenic value is associated as a rule with a high iodine value of the acetone-insoluble lipoids of the liver and heart, not however of the brain.

The Noguchi method of preparation of an antigenic extract, based upon these principles, has been in the writer's hands the most successful. He will not take time to discuss this method more than to say it is simple and quite successful in the end-results—mince calf's liver or heart, human heart, or syphilitic liver, if you will, with ten volumes of alcohol; allow the mixture to stand in the incubator for a few days, filter, evaporate down almost to dryness with an electric fan, take up the residue in ether, allow to stand over night in the ice-chest, decant the clear fluid, precipitate it with acetone, pour off and discard the supernatant fluid. The sticky substance that remains is the basis for your antigen. Take this up with a small amount of ether, mix with methylalcohol, and store it. Then, when ready for use, mix it with sodium-chloride solution in the proportion of one to nine; determine its dosage by titration with known normal and known syphilitic sera.

The writer has devoted this considerable space to the antigenic extract because this is the stumbling-block of most workers in this line. Antigens made in other ways are unreliable, sometimes you catch the proper lecithin and phosphatids, sometimes you do not. Sometimes, it is anticomplementary, sometimes it is hemolytic. The Noguchi method comes closest to the ideal method of any that has been tried by the writer. The use of watery extract, as originally proposed by Wassermann, entails considerable difficulties due to decomposition and to variations from day to day in the antigenic properties of this kind of material. The writer has used this method and must acknowledge the great difficulties that stand in the way of reliable results with it. And so it was with the various alcoholic extracts, no matter in what manner they were prepared. Sometimes we fail to produce a reliable antigenic extract at all with some of these methods. Again, these alcoholic extracts change rapidly in their potency, sometimes doubling in potency in a day or two, sometimes deteriorating. The writer has made the test sometimes with as many as four different antigens, from various sources, made according to four different methods. Of the methods that are in vogue, outside the Noguchi method, possibly Lesser's ether extract has been most reliable in the writer's hands, yet, this ether extract is capable of rapid changes. The extreme milkiness of the body of fluid in the test resulting from the use of some of the alcoholic extracts is a handicap to the reliable reading of results.

So far as an explanation of the exact rationale of the Wassermann reaction, we are still somewhat at sea. Levaditi and Yamanouchi's

theory* that the reaction depends upon a physicochemical interaction between substances in the serum and lipoids in the antigen, resulting in an alteration in the state of the mixture, has gained many adherents. Recently Wolfsohn and Reicher have shown that the Wassermann reaction becomes positive during anesthesia; it was supposed that the narcotic dissolved in the lipoids of the brain and there exerted some alteration in the anesthetic sleep, with an output of Wassermann reacting substances. Boas and Peterson have found 3 cases of positive Wassermann reactions in 60 cases examined. The writer has been unable to confirm this positive finding in 25 cases of general anesthesia. Further support is given to the physicochemical theory by the observation of Bruck and Stern that the reaction sometimes becomes positive during the "agonal stage." They claim that the reaction could be made to appear positive in normal sera by mixing them with various organs, as a result of the absorption of lecithin from such organs. They explain the reaction on the assumption that the syphilitic infection produces a degeneration of the tissues with a pouring out of proteid lecithin compounds into the blood, and that these substances react physically with similar or identical substances in the antigen to bind complement. They claim that these substances are found in normal organs, but increase in cases of syphilitic infection.

At all events, we can say that on theoretical grounds there is some substance in syphilitic serum, which, in the presence of acetone insoluble, and ether soluble bodies, binds complement and inhibits hemolysis when hemolytic amboceptor and appropriate corpuscles are mixed.

Another fact which goes to prove that the Wassermann reaction is not dependent upon a spirochætal content for the antigenic-antibody interaction is seen in the recent work of Noguchi with pure cultures of the treponema pallidum. He has made an attempt to use an extract of the spirochæta for the complement fixation test, and signally failed with it, showing that the binding of complement in the presence of syphilitic serum is not dependent upon the presence of that organism. He proved, however, that this kind of an extract would bind complement in the presence of serum derived from a syphilitically immunized rabbit.

HEMOLYTIC SYSTEM.

Amboceptor (rabbit immune serum)
Complement (guinea-pig serum).... }............Hemolysis.
Sheep corpuscles...................

Amboceptor...... }.........................No Hemolysis.
Sheep corpuscles

Control: To show that serum itself cannot bind complement.

1. Patient's serum.
   No antigen......
   Complement..... }...........................Always shows hemolysis.
   Amboceptor.....
   Sheep corpuscles

*Comptes rendus Soc. de Biol., LXIII, p. 740, 1907.

: To show that antigen alone cannot bind complement.

2. No patient's serum...⎫
   Double antigenic dose ⎪
   Complement.......... ⎬ Should never show inhibition of hemolysis, *i. e.,*
   Amboceptor.......... ⎪   should always be hemolysed.
   Sheep corpuscles..... ⎭

: To show that antigen itself is not complementary.

3. No patient's serum... ⎫
   Double antigenic dose ⎪
   No complement....... ⎬ .... Should never show hemolysis.
   Amboceptor.......... ⎪
   Sheep corpuscles...... ⎭

: Sodium chloride itself should not be hemolytic.

4. No antigen........⎫
   No complement.... ⎪
   No patient's serum. ⎬..............Always inhibition of hemolysis.
   Amboceptor........ ⎪
   Sheep corpuscles... ⎭

: True syphilitic serum.

5. Serum from known syphilitic ⎫
   Antigen..................... ⎪
   Complement................ ⎬ Always inhibition of hemolysis, posi-
   Amboceptor................. ⎪   tive reaction.
   Sheep corpuscles............ ⎭

: True normal serum, from known normal person.

6. Serum from normal person ⎫
   Antigen................... ⎪
   Complement.............. ⎬ Always perfect hemolysis, a negative re-
   Amboceptor.............. ⎪   action.
   Sheep corpuscles.......... ⎭

Amboceptor.—The method of preparing amboceptor might be briefly reviewed. Take a good-sized rabbit, inject him from time to time with freshly-washed sheep corpuscles, free from serum, otherwise you may kill your animal by the anaphylactic poisoning described by Gay and Southard, Rosenau, Auer, Friedberger, and others. This anaphylactic death, as you probably know, is due to the poisoning of the system of an animal by repeatedly injecting proteids found in sera of different animals. As Auer has shown, this is due to a spasm of the muscular fibres of the finer bronchioles, a peripheral effect, causing the well-known ballooning of the lungs as seen in guinea-pigs dying from anaphylaxis. Bleed your rabbit from time to time, and test his serum for its hemolytic value. Dilute the serum one thousand times and see if (after inactivation to kill the natural complement), when mixed with freshly-washed sheep corpuscles, plus a small amount of guinea-pig serum containing complement, it will hemolyse. A rabbit serum is ready for use when, in a dilution of at least one to one thousand, a small amount, say 0.1 c. cm., will hemolyse 1 c. cm. of a 5 per cent. solution of sheep corpuscles in the presence of complement in a few minutes.

One should bleed the rabbit to death from the carotid artery once its hemolytic serum value is found efficient. Allow the blood to clot, pipette off the serum, inactivate it at 56° C. for half an hour, and then titrate it

for its hemolytic value in exact terms, with 1 c. cm. of a freshly-washed 5 per cent. solution of sheep corpuscles, in the presence of 0.01 c. cm. of fresh guinea-pig serum.

TITRATION OF AMBOCEPTOR

Amboceptor 1-1000	Nacl. 0.85%	Complement 1-100	Sheep Corpuscles 5 %	
1.0 cc	0.0 cc	0. 2 cc	1 cc	= HEMOLYSIS
0.8 cc	0.2 cc	0. 2 cc	1 cc	= HEMOLYSIS
0.6 cc	0.4 cc	0. 2 cc	1 cc	= HEMOLYSIS
0.4 cc	0.6 cc	0. 2 cc	1 cc	= HEMOLYSIS
0.2 cc	0.8 cc	0. 2 cc	1 cc	= HEMOLYSIS
0. 1 cc	0.9 co	0. 2 cc	1 cc	= No HEMOLYSIS

Having determined the exact amount of amboceptor necessary for use by serial titration, determine the complementary strength of the guinea-pig serum by using a constant quantity of amboceptor and sheep corpuscles. The "titer" of amboceptor, antigen or complement, is the smallest possible quantity which will suffice to perform the work for which it is introduced into this test.

TITRATION OF COMPLEMENT

Complement 1-100	Na Cl. 0.85%	Amboceptor 1-1000	Sheep Corpuscles 5%	
1.0 cc	0	0.5 cc	1 cc	= HEMOLYSIS
0.8	0.2 cc	0.5	1 cc	= HEMOLYSIS
0.6	0.4	0.5	1 cc	= HEMOLYSIS
0.4	0.6	0.5	1 cc	= HEMOLYSIS
0.2	0.8	0.5	1 cc	= HEMOLYSIS
0.1	0.9	0.5	1 cc	= No HEMOLYSIS

Now determine the titer of the antigen in the same way, using a constant quantity of known syphilitic serum, with falling doses of the diluted antigen. Having determined say, for example, that 0.2 c. cm. of the antigen is the proper amount to inhibit hemolysis in a known syphilitic serum, also determine whether double this dose will interfere with hemolysis of a normal serum. If it does not, then we can go to another control: determine whether the antigen is hemolytic by adding to it all the factors of the test except complement. If it is not hemolytic, then it is suitable for use. The sheep corpuscles are obtained at a slaughter-house by allowing sheep blood to drip into a sodium citrate solution to

prevent clotting, or else by shaking the blood with sterile glass beads for defibrination. The writer also keeps a sheep on hand which he bleeds at times from the jugular vein, for the same purpose. After defibrination, either by mixing with sodium citrate solution or by shaking, making a mark on the centrifuge tube to indicate the amount of blood actually present, centrifuge and wash repeatedly with salt solution. This removes the serum which, of course, is objectionable in the Wassermann system. Then make up the sheep corpuscles in 5 per cent. solution with 0.85 per cent. salt solution.

Method of Blood Withdrawal.—The patient's blood-serum is obtained by venipuncture, coagulation, pipetting off the serum, and heating it for 30 minutes at 56° C. for the purpose of inactivation or destruction of complement. Something should be said concerning the withdrawal and transportation of blood for the Wassermann test. The writer has tried the various methods of finger puncture, ear puncture, vein puncture, using needles, Moore's blood trocar, needles attached to syringes, and even the special needle and aspirating attachment devised by McRae, of New York. The easiest way, the simplest way in all things is usually the best, and so it is with blood withdrawal. Select a vein on the forearm that is prominent, usually at the bend of the elbow. If you do not find one there, as is sometimes the case in women, in men with fat arms, go down further, searching the anterior and posterior aspects. Sometimes it is necessary to use the vein of the dorsal aspect of the hand. In case the vein does not stand out, after applying a tourniquet, beat upon it sharply with a percussion hammer, when it will increase in calibre. After applying a tourniquet, cleanse the arm briskly with ether. Select a needle of large calibre, with a short, sharp point. It is not necessary to use a syringe. The needle, of course, should be absolutely sterile. Thrust it into the vein and withdraw from 5 to 10 c. cm. of blood into a sterile glass tube. A piece of adhesion plaster is placed over the puncture. Slant the blood and let it clot. If there is great need for making the test at once, centrifuge the blood and withdraw it by means of a sterile capillary tube or pipette. Inactivate this serum for half an hour at 56° C. to destroy the natural complement present. Blood can be kept quite a little while in an inactive state provided it is handled in an aseptic manner. Blood occasionally is seen to undergo self-hemolysis if it is kept too long before inactivation. The writer has seen this once or twice in blood coming by mail from a distance.

In addition to the simplicity of the method described for obtaining blood from the patient for this test, the writer favors it because the blood is obtained from the patient and run into test-tubes without as much chance of contamination as if it were run into a syringe-barrel or other instrument. Blood-serum is capable of undergoing remarkable changes when brought in contact with foreign material, changes which

profoundly influence the Wassermann test. Therefore, all possibilities of contamination are to be avoided or minimized as much as possible.

Having prepared the various reagents and tried them, we can proceed with the test. Use only sterile glassware throughout; test-tubes and pipettes should be heated one hour at 100° C. in oven. One should use four different amounts, 0.2, 0.15, 0.05, and 0.025 of patient's serum to determine the degree of the reaction. The writer prefers this to varying the amounts of complement or antigen. Mix patient's serum, antigen and complement in the test-tubes, of course making the appropriate controls—namely, one tube with no antigen to determine whether the patient's serum itself is anticomplementary; use one tube with double the antigen dose with no patient's serum to determine whether the antigen is capable of alone inhibiting hemolysis; use one tube with antigen and no complement to determine whether the antigen is hemolytic; use one tube with sodium chloride alone, with no antigen and with no complement, to determine whether the sodium chloride solution itself is hemolytic. Again, have two sera, one known syphilitic and one known normal, to determine whether all the reagents are working properly. Incubate for one hour at 37° C. or for one-half hour in the water-bath. Add then the sheep corpuscles and the hemolytic amboceptor, incubate or place in the water-bath again for half an hour, and then let all the tubes stand over night. Some mix amboceptor and sheep corpuscles and incubate in this half an hour. This sensitizes the corpuscles and increases the rapidity and delicacy of the test. A positive reaction occurs by an inhibition of hemolysis, the corpuscles of the sheep lying at the bottom of the tube, with a clear supernatant fluid above. A negative reaction is indicated by a clear reddish fluid, with no sediment in the bottom. The writer does not recognize the so-called borderline reactions; even "one plus" reactions are to be regarded as doubtful.

Modifications.—Owing to the apparent complexity of the original Wassermann reaction, various investigators attempted to simplify it and shorten the technical procedure in one way or another. Without going into an elaborate discussion of the modifications that have been attempted, it can be stated that the preponderance of serological opinion to-day swings to as close an adherence as possible to the technique of the original Wassermann reaction. Wassermann and his followers, what is known as the Berlin school of serologists, cling tenaciously to the original technique. The writer is inclined to agree with them. It has been found that all modifications of the Wassermann test have accomplished nothing in the way of shortening the technique without vitiating the specificity of the test. The attempts to produce reagents which can be kept by the practitioner dried upon filter papers, etc., as originally proposed by Noguchi, von Dungern and others, have been practically abandoned even by their originators. All have come to the conclusion that these reagents, antigen, complement and amboceptor, are of a nature not pos-

sible to maintain potent, stable and active under such conditions. Serologists, who have originally advised keeping reagents in this fashion, have admitted the instability of such reagents. So far as the writer is concerned, he sees no advantage in using any modification which does not shorten the process, which does not guarantee reliable results, and which gives positives in cases that are clearly non-syphilitic. He does not believe that any modification so far proposed gives a shorter technique or an easier manipulation than the original. Nor does he believe that any of these modifications give more delicate reactions than the original. Rather do they give results at variance both with the Wassermann reaction and the clinical findings. The writer has used them side by side with the straight Wassermann technique, and must say that they have all suffered by comparison with the clinical findings and the straight Wassermann test. Furthermore, positive reactions with modifications and negatives from the same blood with the straight Wassermann techniques have been seen by the writer, where the subsequent clinical findings showed the Wassermann test to be correct and the modifications incorrect.

At this place it would be well to call attention to what the writer believes are the most ideal conditions under which good serological work is to be performed—namely, with the serologist always in sublime ignorance of the clinical history of the case he is investigating. He would, therefore, recommend that in no instance should the Wassermann worker be furnished in advance with the clinical history of the case. In no instance should he ask the patient a single question regarding his condition. The clinician should tell the serologist nothing about the symptoms of the case. Preferably the serologist should never see the patient at all. The blood should be withdrawn by the clinician and sent to the serologist under a number, not even the name of the patient should be given. Besides, this work should be controlled by sending the serologist from time to time two or three tubes of the same blood under separate names. Normal bloods should be sent from time to time for control. Bloods from the same patient should be divided and sent by several physicians to the serologist. This would first prevent the serologist from being unduly swayed in reading off his records; secondly, knowing that these controls are being made from time to time, the serologist would be kept on the *qui vive* and would aim to do constantly accurate and reliable work. This may sound absurd to some and possibly may be resented by others as an imputation upon their honesty, yet the writer contends it would redound to the good name of serology were the system followed and every worker compelled to stand upon his own merit. He heard the accusation made last year in many quarters abroad that in no country in the world has so much poor work been done in diagnostic serology as in America, mainly because the work here has been attempted by untrained workers— by office girls who have obtained a smattering of laboratory technique,

possibly from well-qualified clinicians who know the principles and practice of urinary analysis, sputum work, blood-smears, etc., but who have never been trained in serology. He has seen some otherwise very intelligent students who positively could not learn to handle pipettes accurately. Certain it is the Wassermann work requires a high standard of laboratory training and aptitude, never-ending zeal and close application. These factors should be considered by the clinician in entrusting his consultation work along these lines, else this work will fall into disrepute that is undeserved. The limitations of the test are many, the limitations of the worker are boundless. The chances of error in diagnosis as a result of these sets of limitations should constantly be borne in mind.

Eliminating for the moment the limitations of the workers in serology, let us say in as few words as possible something about the limitations of the Wassermann test itself in making up the full diagnosis. What does a positive reaction mean, what does a negative mean? In the writer's experience he has never found a positive Wassermann reaction in any other disease than syphilis. It has been claimed that it is sometimes positive in yaws, a tropical spirochætal disease. The cases of tuberculosis in which the Wassermann reaction has been found positive may all be cases of latent syphilis as well. So it is with malaria, icterus, beri-beri, Hodgkin's disease, typhoid, scarlet fever, diabetes mellitus. In leprosy alone, from his study of the literature, would the writer believe that a Wassermann reaction has been found positive: in the lepra tuberosa, not in the lepra anaesthetica. In tabes we find a diversity of opinion as to the exact number of cases in which it has been found positive. Levaditi and Marie were the first workers to find it in this disease. Nonne claims it is present in 75 per cent. of cases in the blood and in 50 per cent. in cerebrospinal fluid. General statistics are about 60 per cent. Examination of this material will be alluded to later. In general we can say of tabes, *"ohne syphilis, keine tabes."* As for dementia paralytica, let us note Plaut's striking figures, who in the sera of 200 cases found but one negative reaction. Furthermore, he found that whereas it was positive in 95 per cent. of cases examined in the blood-serum, it was present in 99.5 per cent. in the cerebrospinal fluid. Edel and Lesser found it present 62 times in 62 cases examined—namely, 100 per cent.

The writer might add here some of his personal experiences along this line. From October to March he made an examination for the Wassermann reaction in 300 cases in the service of Dr. W. W. Graves, at the Alexian Brothers' Hospital, St. Louis, and in private practice, including eighty examinations of cerebrospinal fluid. Of these cases the reaction was uniformly positive in all cases of paresis.

In congenital syphilis, the child with active manifestation constantly shows a positive Wassermann reaction.

A Wassermann reaction may spontaneously disappear from the blood

and later reappear, entirely independent of treatment. For this reason, the writer believes in the routine serial examination of blood for the Wassermann reaction. He has seen a reaction negative for a period of six weeks, examined weekly, then suddenly become positive, independent of treatment. As for the influence of treatment upon this reaction, it might be said that antisyphilitic treatment usually makes it become negative, yet we have instances where under full treatment a negative may become positive. It may become stronger under treatment where before treatment it was weaker, not on account of the treatment, but in spite of the treatment.

Can we prognosticate from Wassermann examinations? Can we say to a patient that because he has received careful treatment and has a negative reaction, he can be assured that he will not develop tabes or paresis? Emphatically no. Are we warranted always in suspending treatment when the reaction becomes negative? No. We likewise know nothing as to the significance of the persistence of the reaction in the so-called late-latent period. A positive Wassermann reaction means simply that here we have a symptom of syphilis, and that such a case must be treated as syphilis. The persistence of the reaction has no great prognostic or therapeutic importance.

The writer alluded before to the examination of cerebrospinal fluid. His attention was kindly turned to this material some time ago by Graves, of St. Louis, who suggested to him the use of the Hauptmann method of examination of this fluid. As outlined by Hauptmann,* far better and more accurate results are obtainable from examination of spinal fluid by using large quantities than could be obtained by using the 0.2 c. cm. amount originally advised. In other words, this material is to be handled differently from blood-serum. Hauptmann uses five tubes containing amounts of fluid as follows: 1 c. cm., 0.7, 0.6, 0.4, 0.2, with corresponding salt solution. In this way we get positive results where we would not get them if we used only 0.2 c.cm., also we get some idea of the degree of the reaction. This method has been eminently successful in detecting the Wassermann reaction in spinal fluid. In Graves's service, the four reactions of Nonne for syphilis are rigidly looked for—namely, the Wassermann reaction of the blood, the Wassermann reaction of the cerebrospinal fluid, the Nonne-Appelt globulin reaction, and the lymphocyte count. In cases of syphilis of the cerebrospinal system, one or all of these reactions may be present. Sometimes, the blood is negative and the cerebrospinal fluid positive, sometimes vice versa, sometimes both may be present. A positive of the blood and a negative of the spinal fluid is of considerable importance in differential diagnosis. For instance, a positive of the blood in the absence of a similar reaction in spinal fluid may indicate that the patient has a generalized syphilitic in-

---

*Deutsch. Zeitschr. fuer Nervenheilk., Bd. 42, Hft. 3-4, 1911.

fection, and that his neurological symptoms are not due to an involvement of the cerebrospinal axis.

In closing the writer should say that the Wassermann reaction placed where it belongs—namely, secondary to the clinical manifestations, is of considerable importance in working up the diagnosis of lues. It is a symptom, and only a symptom, and should never be given greater consideration or thought than simply a symptom. The writer does not believe that this or any other laboratory test should outweigh a group of well-marked clinical manifestations. When positive, it should be an important factor in assisting in a diagnosis. When absent, manifestly it should not serve in any sense to eliminate the possibility of syphilis. At times a wide gap is left by a negative Wassermann reaction, particularly in supposed tertiary cases. In such instances, Noguchi's new luetin test, in the writer's opinion, will serve at times as a means of adding another important symptom where the Wassermann test has failed.

THE CLINICAL DIAGNOSIS OF RENAL INSUFFICIENCY.

By DUDLEY FULTON, M. D., of Los Angeles,

Assistant Professor of Theory and Practice of Medicine, University of California (Los Angeles Department).

The view of nephritis as a primary inflammation or degeneration of the kidney, and the usual custom of looking for the evidences of such changes in the urine, are responsible for a too narrow conception of the subject.

The pathogenesis and nature of some forms of nephritis are quite lacking in clearness. In some of the chronic nephritides it seems pertinent, indeed, to ask whether we are dealing with a primary disease of the kidney, or whether the renal changes are not secondary to some disorder of metabolism, which at the same time produces pathological changes in other organs, such as the cardium, arteries, retina, and the central nervous system. There seems to be no valid reason why a condition giving rise to such widespread pathological changes should be so frequently designated "nephritis," any more than a disease of any of the above organs. If nephritis in some of its forms, at least, is nothing more than a local evidence of a general condition, is it not fallacious to give major diagnostic value to the examination of the urine and to attach minor importance to the equally valuable general signs and symptoms?

It seems quite certain that in the condition known as uremia, we are dealing with more than disturbances limited to the kidney. The knowledge pertaining to the formation of urea and other urinary substances is, in spite of an immense amount of investigation, limited. It is well known that the liver shares equally with the kidney in faulty synthetic power in the eclampsia of pregnancy, a condition which closely resembles uremia. In both of these it is probable that we have to deal with complex disturbances of metabolism. The kidney, which is essentially an excretory organ and the eliminatory servant of the entire body, reflects the latter both in health and disease; and it is logical to assume, in certain disturbances of metabolism, of the exact nature of which we are at present ignorant, that that which we designate "nephritis" is, in fact, some general toxemia, the products of which irritate the kidneys and furnish the evidences of damage to these organs by abnormalities in the urine. Claybrook considers that the disease known as nephritis should no more be considered a disease of the kidney than diphtheria a disease of the throat.

Suggestive proof of the above is not infrequently found, clinically, in cases fatally uremic, with kidneys anatomically sound at autopsy; the

converse is also observed in patients who, during life, reveal no symptoms of nephritis, but at autopsy present pathological changes typical of nephritis.

The experienced clinician in routine work diagnoses nephritis from the physical examination of the patient—the cardiac hypertrophy, secondary anemia, retinal changes and other lesions of the nervous system, chronic vascular hypertension, edema, dyspnea, and the facies—rather than by the examination of the urine.

The urinary findings are relatively less valuable than the physical examination. Were the physical signs and symptoms and the urinary findings to offer conflicting evidence; for example, should edema of the face, retinal hemorrhage, and vomiting occur in a patient whose urine was free from albumin, as in a case recently seen, the clinical evidences should outweigh the negative urinary findings.

The diagnosis of renal insufficiency should never be made from the urine alone. One might correctly diagnose simple inflammation or nephritis; but the latter without renal insufficiency, speaking from the functional or clinical standpoint, is of no importance. Nephritis is an anatomical or pathological disturbance, and may, or may not, be accompanied by insufficiency. In interstitial nephritis, a form accompanied with marked anatomical changes in the kidneys, there may be little or no insufficiency of the kidneys over a period of years.

The physician should, in bedside work, consider the subject from the functional standpoint rather than from that of the pathologist, although in a general way the two are inseparable. By analogy, the heart may be functionally competent in the presence of valvular lesions of long standing. Albumin and casts in the urine are in themslves no more significant of renal insufficiency than a mitral murmur is evidence that the heart muscle is inadequate to perform its functions. Neither of the above is clinically active, unless accompanied by "broken compensation" of these important organs.

Renal insufficiency is frequently confused, clinically, with nephritis and renal irritation.

Albumin, casts, epithelium, and blood-cells in the urine are signs of renal irritation from various causes—tuberculosis, stone, inflammations (nephritides), new growths and surgical conditions. Albuminuria means nothing more than this. Its significance should always be interpreted by the associated signs and symptoms. Too often in routine work albuminuria is diagnosed nephritis, as glycosuria is diagnosed diabetes, and a surgical condition of the kidney, thereby, left untreated. Renal irritation may, or may not, be associated with renal insufficiency.

Insufficiency is the most serious renal mishap that can occur to a patient, for, in a narrow sense, it matters not how badly damaged a kidney may be so long as it adequately performs its functions.

Every clinician has observed cases of marked renal insufficiency, with

albumin only in a trace, or entirely absent from the urine. The signs and symptoms of such are usually best observed in disturbances remote from the kidney—renal asthma, cardiac hypertrophy, high arterial tension, edema, retinal hemorrhage, vomiting, etc. In such instances the urinary examination usually, but by no means always, confirms the clinical diagnosis.

Nephritis may exist without the signs of renal irritation or without renal insufficiency. Cabot, in his study, found, at autopsy, lesions of the kidney typical of nephritis, without the patient having presented the urinary evidence of it during life, and vice versa.

A nephritic patient may live for years without functional insufficiency until unfortunate conditions arise which produce a break in the compensation of the kidney, such as occurs in pathological conditions of the myocardium.

One of the most important thoughts the writer desires to convey in this article is that there is a clinical difference between nephritis and renal insufficiency, and that the former, without the latter, is of no immediate importance, although it should not be understood that it does not always presage grave danger of ultimate uremia, and the necessity of prophylactic measures.

If the foregoing observations and deductions be true, it follows that it is just as fallacious to diagnose nephritis from urinary evidences as it is to exclude this disease because of the lack of them.

In consultation and clinical work, renal insufficiency has been frequently observed in cases where it had been diagnostically excluded because of the absence of albumin and other urinary evidences of kidney disease.

The use of the sphygmomanometer, ophthalmoscope, stethescope, and physical examinations, present much more reliable diagnostic data than do the urinary findings. For example, we should be very doubtful of nephritis in a case of albuminuria if there is not associated with it high arterial tension and cardiac changes. The converse is true. Patients with high tension, cardiac hypertrophy, and failing vision, sooner or later, show renal insufficiency and albuminuria.

The physiological tests of the functions of the kidneys unfortunately are of dependable value only in surgical nephritis, all having shown wide variations in the nephritides. It is quite possible that this is due to the widely variable functional ability of pathological kidneys. It would be interesting to know if any of these tests would show consistent findings in broken compensation of the kidneys. Since the latter is evident, clinically, by non-urinary symptoms and signs, the use of the functional tests is not likely to be of practical value in medical nephritis.

The measurement of the output of urea, ammonia and other salts is of undoubted value, if the intake of food substances is known, and if

their accurate estimation were more accessible to those not in touch with a highly trained laboratory worker.

The measurement of the twenty-four-hour output, the specific gravity, the reaction, the color, and other macroscopical characteristics, together with the still more reliable findings obtained by the physical examination of the patient, are of greater importance and outweigh in value the quantitative estimation of albumin and the finer tests of urinary changes.

314 Grosse Building.

SOME PECULIARITIES OF MEDICAL PRACTICE IN PORTO RICO.

By C. E. Ruth, M. D., of Des Moines, Iowa.

Porto Rico represents about one-eighteenth as much land surface as the state of Iowa and has one-half as many inhabitants. There are two hundred and fifty doctors in Porto Rico or one to every six thousand of population, while Iowa has about three thousand doctors or one doctor to every six hundred people. In many of the cities of the United States there is one physician to every three hundred.

By the ordinary methods of practice, as usually employed in this country, it is physically impossible for one doctor to care for six thousand people: and in Porto Rico the difficulties are increased almost incalculably, owing to the fact that those who are the most needy live in large part far up in the mountains, on trails often almost or quite inaccessible for anything except it be for goats.

About one-half of the physicians of Porto Rico are in the employ of the government as health officers, or are employed by the municipalities as physicians to the poor. They hold their positions by virtue of their political affiliations or pull. All the physicians of Porto Rico are graduates, and most of them of good schools. Formerly, it was the custom to study medicine in Barcelona, Madrid or Paris, but more recently the greater number receive their degrees from medical colleges and universities of the United States, mostly New York and Pennsylvania, though a few have come as far west as Ohio. Nearly all the younger physicians of Porto Rico speak excellent English, and not a few of the older ones have a tolerably good understanding of the language. The island is divided into a number of districts called municipalities, corresponding in some measure to our counties; and these, when the expense could be borne, have erected hospitals, and are thus trying to do something to meet the needs of the sick poor, though the supply is notoriously inadequate. Three-fourths of the population are entirely unable to pay for medical services, and one-half of the population make no effort whatever to secure medical attention, and trust to domestic remedies, incantations or death to relieve them of their miseries. More than ten years ago the Presbyterian Church opened hospital and dispensary work in the city of San Juan, and later they did the same in Mayaguez. These free dispensaries are operated in connection with their hospital work. The pioneer medical missions have accomplished much good, to which the native nurses they have trained are contributing no small part.

In Ponce a splendid hospital building has been erected in a beautiful location overlooking the city and port, through subscriptions taken, and directed ostensibly by the Protestant Episcopal Church; but it became at once to all intents and purposes a private institution, so that much of its prospective benefits to the unfortunate classes has been lost.

In our three years' residence in Porto Rico, we found that one physician can give from eight to twenty thousand treatments per year in dispensary service suitably organized and systematized, at a cash outlay of about one thousand dollars. In other words, the physicians already there could easily, if so inclined, in this manner, care for all the sick if a sufficient number of dispensaries were located within reach of the people.

To erect these little dispensaries would not cost more than one hundred dollars apiece, and in many places the little mission chapels can be used without any cost except the first outlay for supplies; then by charging ten to twenty-five cents for the medicines to last the patient two weeks, almost all the chronic, and most of the prevalent diseases can be cured or relieved. By this plan we have found that but a very few require hospital care. Of course, some of the neglected chronic cases, and all the heavy surgical cases must have hospital attention. In 1908 the writer knew of no municipal or church hospital in Porto Rico provided with screens to keep the flies out of the operating room, to say nothing of the other parts of the hospital. Now, many of the municipal hospitals are screened throughout, and slowly the people are learning the danger of the mosquito and the fly as disease-carriers, though as yet many of the hospital attendants there consider the presence of the fly in the operating room sort of a joke on the over-particular or cranky and careful operator, who insists that the last fly shall be killed or driven out before anything sterile is exposed in the operating room.

It almost goes without saying that a working knowledge of the Spanish language is imperative for practice there, though in some of the dispensary services long established, one can do tolerably well with the aid of an interpreter.

The use of an interpreter in medical practice, at all times unsatisfactory, is for private practice entire impracticable. The writer has seen a physician, after a residence of one year in Porto Rico, doing dispensary practice with the aid of an interpreter, entirely unable to examine and prescribe for a patient and give directions in Spanish, yet the majority never employ an interpreter after six months, and some not after the first three.

Perfect mastery of the Spanish language, however, is a question almost impossible to those who have not acquired it in early life.

For surgical work the climatic conditions are ideal, for the great problems in the United States (heat and ventilation) are in Porto Rico arranged for naturally, and only need that man's devices shall not too greatly interfere with the provisions of a beneficent providence. It is nearly always warm enough, and almost the only protection needed is

against storms, the sun and mosquitoes; except at night it is nearly always sufficiently cool to require some protection, and in the mountains, even in the summer-time, two or three blankets are needed at night. Windows and doors can, and usually should be, left open day and night the year round. The natives, however, are very much afraid of the night air. Indeed, they are afraid of outside pure fresh air at all times when they are suffering from any illness, particularly fevers; for the patient will be found nearly always in a room from which as much air and light as is possible is excluded, and often in a room so small that it will but little more than accommodate the cot on which the patient lies. These patients will be found in this condition breathing over and over again the foul atmosphere when the outside temperature in the shade is 95° F.; hence, the temperature within the room can be imagined, with a metal roof six or seven feet above the floor and a tropical sun pouring down upon it. The wealthier class, though it must be admitted that their houses are well ventilated and the ceilings high, are by no means exempt from the fear of outside air during the night. On the writer's arrival in Porto Rico he was informed by some of the best physicians there that union of wounds in major surgery by first intention without suppuration was not to be expected, and was practically never attained, owing to the climate and physical condition of the patients. This proved to be an error, for wounds unite as promptly and as well as in the States. In our experience, suppuration in surgical wounds almost never occurred, even in the heaviest abdominal or bone surgery even in those who were suffering from anemia (hook-worm), malaria or syphilis, one or all, as complications. Owing to the enormous prevalence of venereal disease, the writer expected to find many cases of ectopic gestation, but was informed by one of the best physicians of thirty years' experience, that the condition was unknown there. The writer met but one physician who had seen a case in Porto Rico. Out of a total of five hundred operations we had three of ectopic gestation. Nevertheless, the writer is convinced that there are great numbers of these unfortunate cases unrecognized. Carcinoma of the uterus is very prevalent, and seldom comes to the knowledge of the physician until well advanced, and often entirely inoperable. As would be expected, pyosalpinx is very common. Elephantiasis involving the lower extremities, scrotum and labia majora is very prevalent among those living in the lowlands, often attaining enormous proportions. It is not a very unusual thing to find the legs of patients measuring twenty-five and more inches in circumference from the ankle to the body, and frequently both legs are equally involved as well as the entire external or tegumentary genitalia. Strange as it may seem, the enormous weight is often the only inconvenience of which the patient complains; but periodically attacks of lymphangitis, which form part of the progress of the disease, will cause fever and pain lasting for varying periods of time. Until recently amputation was the only remedy for this pitiable condi-

tion. Medical treatment so far has been of little value, save that in some cases quinine seems to give prompt relief, though the writer is sure that in almost all the cases occurring in his experience, there was malarial complication also, which may account for the benefit received from the administration of quinine. In none was there any curative influence exerted on the elephantiasis, except that which would naturally result from the lessening of the fever in relieving the malarial complication.

Rest in bed with heavy bandaging will sometimes so reduce these limbs that the patient appears practically well. This improvement is not maintained; for as soon as the patient is on his feet again, the condition quickly returns. However, taken early, much may be done to retard the growth by suitable bandaging, and the use of elastic stockings properly made.

Excision of the subcutaneous lymph-bearing area to the perimysium will give very satisfactory results; and, where the growths have assumed a nodular or markedly irregular outline and there remains much redundant thickened integument, the excess should be excised. We have operated upon fifteen of these cases without mortality, and with nothing but the most gratifying results. In several of these cases the dimensions and contour were restored to almost perfectly normal, without any impairment whatever of function.

Dr. Lopez Nusa of Ponce, Porto Rico, one of the pioneers in this work, says that he gets the best results in those cases in which he has the most extensive suppuration. This being true in his experience, can only be explained, we think, by the greater destruction of the subtegumentary lymph-bearing area and consequently greater subsequent contraction than would have occurred from his operative removal alone. In our earlier cases, we used long incisions, often ten to sixteen inches, followed by the use of tubal drainage for three or four days; and the result was that at times there was considerable sloughing and suppuration. Later, we used only short incisions in greater number, though removing the tissue quite as extensively as in the earlier cases, and drained with gauze for twenty-four hours. The suppuration by this latter plan was slight, sloughing almost nothing, and some cases gave neither sloughing nor suppuration, with the result that the stay of the latter cases in the hospital was reckoned in days, or four weeks at the longest; while some operators have reported a stay of from four to nine months in the hospital when the suppuration was extensive, especially in those cases requiring more than one operation, where the involvement was too extensive for complete removal at a single sitting. Six weeks was the longest time that any of the cases we have operated upon remained in the hospital. Elephantiasis is found only in those who have spent many years, particularly of their early life, in the lowlands near the coast, where the mosquitoes were numerous, and protection against mosquito-bites is not taken at all, or very indifferently.

Naturally the successful removal, surgically, of the manifestation of

this disease does not remove the filarial blood-infection which through obstruction to the lymph-channels causes the condition; and the question of a return of the condition naturally comes up for consideration. We have noted no tendency to return thus far in any of our cases, but in one case, one year after operation, the patient had another severe attack of lymphangitis. In this case, however, the leg had been of enormous dimensions, measuring twenty-seven inches in circumference six inches above the ankle, and the involvement extended to the trunk. She was suffering from anemia (hook-worm) to such an extent that a thorough removal of the tissue involved below the knee was not practical; and no attempt was made to operate above the knee. During the attack of lymphangitis occurring one year later, the inflammation was much more severe above the knee, in the parts not previously operated upon, and here an extensive slough took place on the inner side of the thigh. The condition is rarely, if ever, fatal except occasionally through complications, as chyluria and hematuria. The most important thing in this, as in other tropical diseases, is prevention first by destruction of the mosquito, securing thereby at the same time protection against malaria and yellow fever; and next the education of the people in regard to the danger of being bitten by mosquitoes. Few of these people feel a mosquito-bite, and most of them are too poor to own a net to sleep under, and none of the houses are screened, so that the mosquito has every opportunity to do its worst. On the south side of the island, where three years ago there were no dispensaries (save where some effort was being made by the municipalities, or where the insular government had anemia stations), there are seven now, giving about twelve hundred treatments per month. The question is, What will the end be? When will that other five hundred thousand get some care? It will be many years before the native physicians will do it, and American physicians will not go there and undertake the work without some assurance of support from the home land, because most of these fields will not yield sufficient money from outside private practice to support a physician.

In the mountain districts, the sick are often unable to walk from ten to forty kilometres to a municipal hospital already full, too poor to hire a horse to ride or four to eight men to carry them in a hammock over the mountain trails to dispensaries so remote. The all-important question in the matter is, What is your duty and mine regarding it? One thousand dollars will support a medical missionary there for one year, and he could treat eight to twenty thousand of these people during that time, who otherwise would get no attention whatever.

The writer recalls but 4 cases of leprosy in his dispensary and private practice, all within the last year. Probably several more were seen, but not recognized, because of his inability readily to diagnose them in the incipient stages. Both the anesthetic and tubercular types are encountered. There is a leper colony located on a small and almost barren island at the

entrance to the harbor of San Juan, but quite a number of the cases in various stages are living scattered throughout the island. The anesthetic variety seems to be the more common. The real scourges of Porto Rico are anemia (hook-worm), syphilis, malaria and tuberculosis. Eliminating these preventable diseases, the health statistics of Porto Rico will compare favorably with those of any part of the world.

407 Equitable Building.

THE BETTER UTILIZATION OF CITY HEALTH RESOURCES IN SUMMER.

By Arthur A. Howard, M. D., of Boston,

Junior Assistant Physician, Children's Hospital, Boston; Medical Director, Milk and Baby Hygiene Association, Boston.

Each advance made in medical knowledge and understanding of the more dreaded diseases has been marked by improved methods for their control and elimination. Smallpox, typhoid fever, tuberculosis and many other diseases have been made to feel the check of the scientific methods and regulations of local and national Health Departments.

The constant increase in the size of cities and the density of urban population is giving rise to new dangers to health that demand attention and active efforts on the part of physicians and Health Departments. The portion of the population which is paying the heaviest penalty for these conditions is evident from the shocking mortality that exists among the infants and younger children of our cities and towns. The annual deaths that occur among babies under one year of age alone is nearly double the number of deaths from tuberculosis. An investigation of the infant death-rate in one's own city should convince one of the importance and urgency of the problem.

Quite logically we ask, What diseases are responsible for this high infant death-rate? Investigation shows that, aside from still-births and congenital defects, gastro-intestinal diseases with resulting conditions and respiratory diseases are responsible for the greatest number of infant deaths.

The mere treatment of infants and children for these diseases cannot, however, materially decrease the death-rate. It is the consensus of opinion among those who have studied the subject that improper food, overcrowded and unhygienic living conditions are the predisposing factors which are the underlying cause of the high death-rate among city infants. It is to means of overcoming and mitigating the influence of these factors that attention must be given if the health and general physical condition of city children is to be benefited.

The established hospital facilities—and from necessity a large majority of the residents of overcrowded districts are dependent upon the hospital or city physician—are ridiculously inadequate to cope with the infant and child population. Then again, at the hospital if a child is treated in the out-patient department or even taken into the wards and cured of an illness, it is then returned to the same disease-predisposing home conditions; surely not a rational method of securing a permanent improvement in morbidity or mortality.

Some of these objections are at least partially met by the methods that may be employed on a hospital boat. For example, the Boston

Floating Hospital—as its name suggests—is a boat equipped as a hospital, and has an out-patient department and permanent wards for the accommodation of about two hundred and forty infants and children. During the summer months daily trips are made down the harbor where the boat is anchored until the return in the late afternoon. This makes the out-patient or "Day Patient" ward, as it is called, a semi-permanent ward. The patients receive the benefit of the supervision of the physicians and nurses for the entire day. It assures the infant or child, of clean, properly prepared food, given at the proper time and in proper amount. Also, what is perhaps even more important, the entire day is spent in the open air and the child is stimulated by the cool sea breezes instead of being prostrated in the hot and overcrowded tenement home. For the last two years the babies on leaving the boat at night have been supplied with a sufficient number of feedings to last until their return to the boat the following day, thus obviating the detrimental influence of improper home feeding.

The patients in the permanent wards—the cases which are actually ill —have the advantage of spending the entire twenty-four hours under these helpful conditions. When sufficiently recovered they are sent to the Day Patient Ward and their convalescence safeguarded by supervision, proper food and fresh air.

For cities which are not situated on water-ways, the writer can see no valid reason why the same plan and methods could not be carried out on land. With due regard to location and grounds, a building having large, easily ventilated rooms could be equipped for permanent patients with protected verandas, supplemented by tents, utilized as Day Patient quarters.

The number of Day Patients which can be handled by a small staff of nurses may be materially increased by the plan employed by the Boston Floating Hospital, requiring that there remain as an attendant with each baby some member of the family capable of caring for it under the supervision of the nurses.

Open-air schools, more parks and playgrounds are aids in keeping the older children out of the unhealthy crowded sections of the city. Properly conducted outings to the country and the more elaborate plan of having groups of mothers with their babies and younger children at the seashore or in the country, from one to two weeks, have proved practical as well as beneficial under the management of settlement houses of some of the larger cities. During the most severe heat of last summer arrangements were made for free rides on the ferry-boats in Boston harbor. This opportunity for a cooling and refreshing airing was eagerly accepted by large numbers from the tenement districts in the vicinity of the ferries.

Out-of-door sleeping accommodations during the summer should be more extensively provided. Anyone who has visited the more densely populated districts of a large city on a hot summer night can well realize that health as well as comfort is at stake. The promiscuous throwing

open of parks and playgrounds is, of course, impracticable and undesirable. It is, however, desirable and practicable that with necessary sanitary regulations and adequate police and medical supervision certain parks and vacant land be set aside, and tents provided for sleeping purposes.

Milk stations located in the centres of congested districts offer an excellent means for philanthropic organizations or municipal bureaus to provide clean milk, supervise the care of the infants and children, and improve living conditions.

In the Boston milk stations clean milk and properly modified milk with sufficient ice to keep the milk cool for twenty-four hours is distributed each morning at the different stations. The milk is sold at cost. The distribution is under the direction of the nurse in charge of the station, who questions the mother or representative of the family calling for the milk in regard to the baby's condition. If there is any question of illness the baby is at once visited, and if the child is ill it is at once sent to a hospital or placed in the care of a physician. At least once a week a conference is held in each station by the physician in charge. The baby is weighed, and any necessary changes made in regard to its food. As these conferences are for well babies, the physician can give all his time to instructing the mothers on preventive measures: care of the milk and feeding bottles in the warm weather, the danger of flies, and the relation of the clothing to the weather, etc. The nurse gives all the rest of her time to visiting the babies in their homes. This gives her an opportunity to see that the instructions of the conference physician are carried out in the best way possible with the materials and conditions at the mother's disposal. She also sees that proper attention is paid to the ventilation of the home, the sleeping quarters of the baby, and the general hygiene of the home. Practical demonstrations by the nurse are a very valuable means of teaching hygienic living; and, by safeguarding the health of the baby, the health of the other members of the family is protected by better living conditions. All this work is educational—educational along prophylactic lines.

The work carried on in the homes by the milk-station nurses and the "follow-up" work of the hospitals and representatives of other organizations interested in child welfare are meeting and influencing at their very source the chief factors and conditions responsible for a high mortality rate among city infants.

The development of co-operation between the various organizations already interested in child welfare, so that a continuous chain of medical supervision of the child exists from the pre-natal period through the school age, is greatly to be desired.

Providing clean milk, increasing out-of-door hospital facilities, out-of-door playgrounds, trips to the country, suitable out-of-door sleeping quarters, and the education of those living in congested districts, in matters of hygiene and the value and proper use of the out-of-door advantages provided, are some of the means of better utilization of city health resources in summer.

MEDICAL AND SURGICAL PROGRESS.

RECENT ADVANCES IN CANCER RESEARCH.

A REVIEW OF RECENT LITERATURE.

By MOYER S. FLEISHER, M. D., of St. Louis.

1. Arzt: Chirurgenkongress, 1911.
2. Caspari and Neuberg (*Deutsch. med. Wochenschr.*, No. 8, p. 375, 1912).
3. Freund and Kaminer (*Wien. klin. Wochenschr.*, p. 1758, 1911).
4. Freund and Kaminer (*Biochemische Zeitschr.*, No. 26, p. 312, 1910).
5. Freund and Kaminer (*Wien. klin. Wochenschr.*, p. 1221, 1910).
6. Freund (*Wien. klin, Wochenschr.*, p. 220, 1911).
7. Kraus, Ishiwara and Winternitz (*Deutsch. med. Wochenschr.*, p. 303, 1912).
8. Kraus, v. Graff and Ranzi (*Wien. klin. Wochenschr.*, p. 1003, 1911).
9. Kraus and v. Graff (*Wien. klin. Wochenschr.*, p. 191, 1911).
10. Monakow (*Muench. med. Wochenschr.*, p. 2207, 1911).
11. Neuberg (*Biochemische Zeitschr.*, No. 26, p. 344, 1910).
12. Ranzi (Kraus and Levaditi: Handbuch der Technik und Methodik der Immunitætsforschung, Erganzungsband, p. 613, 1910).
13. Stammler: Chirurgenkongress, 1911.
14. Wassermann, Keysser, and M. Wassermann (*Deutsch. med. Wochenschr.*, No. 51, p. 2389, 1911).
15. Wassermann and Hansemann, Keysser and M. Wassermann (*Berl. klin. Wochenschr.*, No. 1, 1912).

The impetus given to the so-called chemotherapy by the announcement of the discovery of Ehrlich's salvarsan has now advanced so far that we find it, at least in an experimental manner, applied to the treatment of tumors. The results, which have been obtained, are not so definite that we can prophesy anything regarding its future application in the treatment of malignant neoplasms in human beings, but from the point of view that the experiments of Wassermann and his collaborators represent the first successful attempts in the direction of a treatment which seems to hold out any clew to the possible solution of this problem, they are certainly worthy of a very close and searching scrutiny.

It may be well first to state the basic principles of chemotherapy, and upon what theoretical basis the work done heretofore has been founded. In the search for specific remedies for various diseases, Ehrlich at-

tempted to find some substance which would have a chemical affinity to the special organism which he sought to destroy, an affinity very much greater to the organism, than for the body-cell which is the host of the infection. In other words, a substance was sought which would be relatively harmless to the host and very toxic to the agent causing the disease. Accordingly, by using various substances composed of some toxic element—such as arsenic, as in the case of salvarsan—and the various organic chemical radicles, a substance was finally sought, which would have a very much stronger affinity to the organism under consideration than to the body-cells, the object being to inject this chemical into the affected individual in a sufficiently large quantity to destroy the offending invader, but not to affect the well-being of the host. This was gradually accomplished by combining many different organic radicles with the toxic substances, and noting those combinations which seemed to have the most marked tendency to combine with the pathogenic organism. Ehrlich believed that the same process occurred in this reaction as he maintained takes place in the combination of toxin and antitoxin— namely, that chemical radicles of certain cells or substances combine with other chemical radicles with much greater avidity than do the constituents either of the same cells or other cells. The various organic radicles, which he combined with the toxic substances, acted as the special substances—haptophores—which bound the poisons to the cells or organisms on which he desired to act.

Wassermann's experiments were to determine whether tumor cells remained alive longer in the blood of cancer patients or of normal individuals, and he used selenium and tellurium salts in order to determine whether the cells were alive. Tellurium and selenium are precipitated from their salts by living cells, apparently as a result of the action of some ferment which is contained in living cells. Wassermann noticed that these substances were precipitated within the tumor cells, and especially about the nucleus; and he believed this reaction to be, to a certain degree, specific for tumor cells. He also believed that as a result of the precipitation of selenium or tellurium about the nucleus, the cell would be destroyed, and, therefore, he attempted the treatment of tumors by injection of the salts.

When these salts were injected directly into tumors of mice, it was noted that the tumors softened and broke down; and in some cases the tumor actually disappeared and there was no recurrence.

For some reasons—and especially because of the possible existence of metastases distant from the original tumor mass—this method of injection directly into the tumor did not seem to be the best. It was necessary to devise some method of injecting these metals into the blood and allowing them to act on all the tumor cells which might exist in the body. As fluorescent substances are very rapidly disseminated throughout the body, it was determined to use such substances to carry these metals through the blood-stream to the tumor. Many combinations of selenium and tellurium with such substances were tested before one was finally found that was suitable for use. This was a combination of selenium and eosin.

When this selenium-eosin compound was injected into the bloodstream of the mice, within a very short time the animals took on a red color, or at least a pink color, due to the deposition of the eosin in the interspaces of the tissues. The tumor mass was also stained intensely red or pink. In those cases in which the experiment was successful,

after the third injection the tumor began to soften, then progressively it became little more than a fluctuating mass, which finally disappeared as a result of the absorption of the contents. In the majority of cases it was necessary to give eight injections, and, even then, in a few cases the disappearance was not complete and the tumor recurred. When the tumor did recur it was impossible to treat the animal successfully, and whether this was due to the fact that the tumor cells had become resistant to the selenium compound (as trypanosomes do after being treated with various arsenic compounds or some of the aniline stains which have been used in treating these protozoan infections), or, to the fact that it was very difficult to inject these mice which had been treated with eight injections previously, is not as yet clear. The majority of these experiments was carried out on mice which had been inoculated with a tumor, but two mice in which tumors had developed spontaneously were also treated with this substance, and were cured.

There were certain difficulties which Wassermann and his collaborators met with in the course of their work and which they were as yet not able completely to overcome. Even after they had finally found a substance which would act upon the tumor, they found great variability in the strength of this substance; apparently it deteriorated very rapidly, and at times without any accountable reason. They were able to find a method by which they could restore in some degree its activity after it had once lost it, but as yet they have not found a method to produce a compound which, when prepared under exact conditions, will have a definite and constant strength.

They found it necessary to inject into the mice a quantity of the selenium-eosin compound which was just under the lethal dose, and they found that mice in which the tumor was growing were rather less resistant to the compound than the normal mice. In this manner they lost many animals. Furthermore, even when the mouse withstood the injection, and the tumor was being absorbed, two dangers threatened. The absorption of the destroyed tumor material frequently caused the death of the animal, so that it died of toxemia; or the softened mass ulcerated and the mouse died from the infection.

Hansemann's histological examinations of the destroyed tumors prove that the process here is not exactly the same as occurs when an inoculated tumor retrogresses spontaneously, but there is a striking similarity. In the treated animals the process is, however, very much more rapid. Hansemann did not note in any of the organs changes which could be ascribed to the action of the injected compound, but did find, especially in the spleen, masses of the destroyed tumor material, as well as marked lymphatic hypertrophy in both the spleen and the liver.

It does not seem clear that the eosin combined with the selenium should act specifically on the tumor cells; eosin is not taken up by the living cells of the body, but penetrates between the cells in the interstices of the tissues and in the cement substance. That it is taken up more actively by tumor cells than by any other cells of the body is not proved. And whether the action which it exerts is due to deposition in the tumor cells about the nuclei and resulting interference with the life of the cell has not been proved.

The work and results of Neuberg and Caspari, who were working independently on the same problem, viz., the cure of cancer by chemicals, certainly have shown that the selenium-eosin compound is not specific and offer a different theoretical explanation of the action of those "tumoraffine" substances.

Neuberg and others previously showed that tumors contained larger amounts of enzymes than did normal tissues, and that these enzymes were different from those contained in normal tissues. It was with the object of producing a substance which should increase the enzymic activity of the tumor cells that Neuberg and Caspari were working. They desired to so increase the fermentative activity of the tumor that it would digest itself, thus undergo autolysis in the body. It had been noted that radium increases the activity of autolytic enzymes, and it is known that many of the heavy metals in a colloidal state will have the same effect. By injecting intravenously colloidal compounds of many substances they have been able to affect the tumors, and in some cases entirely to destroy them.

They have used colloidal compounds of radium, gold, platinum, silver, rhodium, ruthenium, iridium, lead, and especially copper and zinc. Slight effects have been noted with arsenic and vanadium.

Even a quarter of an hour after the injection, large portions of the tumor were found to be necrotic and fluid, and the centre of the tumor contained only a blood-stained fluid substance.

They first tried their preparation in heroic doses, and after being convinced of the efficacy, they used them in other experiments in quantities which were considerably smaller than the lethal dose. Apparently, to the naked eye, they have succeeded in these cases in effecting a cure, but the microscopic examinations have not as yet been made, and so it cannot be stated definitely that they have succeeded by this method. Their report is only a preliminary one, and is not very detailed.

From these results it becomes apparent that many substances may act upon tumors in mice in such a manner as to destroy the cells and cause a cure. Whether this action be due to interference with the vital activity of the cells from the precipitation of the metals about the nucleus, or to an increased enzymic activity within the tumor, is not clear.

Somewhat over a year ago Freund and Kaminer showed that the serum of patients affected with cancer differed from that of normal individuals, in that it did not destroy or digest cancer cells. Normal serum did digest cancer cells, but did not act on any other cells of the body. In addition, the serum of cancerous individuals, when added to a mixture of cancer cells and serum of normal individuals, would prevent the lysis of these cells; therefore, this serum had a protective property, but apparently had lost the lytic property for cancer cells. Furthermore, when serum of cancerous patients was mixed with an extract of tumor material, a precipitate or cloud was formed, which Freund and Kaminer did not find when serum of normal individuals and cancer extract were mixed.

Neuberg, who had attempted to test the autolytic action of mixtures of cancer cells and either normal or cancerous sera, had observed somewhat similar results.

Freund and Kaminer believed that this reaction was specific; that normal sera would always dissolve the cancer cells, and cancerous serum not dissolve them. They had tested this reaction in various other diseases, but only with cancerous serum had they found the failure to dissolve the cells, the protective action and a formation of a precipitate.

Since the publication of the first articles on this reaction, the work has been taken up by a number of investigators.

Ranzi tested this reaction in a small number of cases and found in the majority the reaction followed the type set down by Freund and

Kaminer; but, since in 25 per cent. of the cancer cases the cancer cells were dissolved, he did not consider the reaction specific.

Arzt found the reaction positive, in the sense of Freund and Kaminer, in almost all the cancer cases treated, and in only a few of the normal cases did the serum not dissolve the cells.

Stammler found the reaction positive, in the sense of Freund and Kaminer, in 80 per cent. of the cases that he tested.

Monakow found that all the serum of cancerous patients, which he tested, did not dissolve the cells; the serum from one patient with sarcoma did dissolve the cancer cells, a fact which Freund and Kaminer had previously noticed. On the other hand, 25 per cent. of the normal sera failed to dissolve the cancer cells.

Kraus, v. Graff and Ranzi found that the sera of normal individuals did dissolve the cancer cells. The sera of 20 of the 28 cancer cases did not dissolve cancer cells; of the 8 that did dissolve the cells, 2 were from patients with epitheliomata which had not metastasized. One case of sarcoma was tested and did dissolve the cancer cells. The sera of individuals suffering from diseases not cancer were tested, and only 24 of 39 showed a lytic action. These investigators also tested the reaction in cases which had been operated and were free from recurrence, and found that the serum from such persons acted like that from normal individuals; it was not possible to state whether this reaction might be of value in early cases as the number of cases tested were too few. Kraus and his co-workers do not consider the reaction as specific, and prefer the meiostagmin reaction.

Freund and Kaminer have laid down certain principles as regards this reaction, which have not been followed by investigators, and, therefore, it cannot be said that the reaction has as yet been given a fair test.

The emulsion of cells of every tumor cannot be used, as the cells from some tumors are resistant even to normal sera; therefore, many cell emulsions must be tested before one can be found which is of value for the test. Furthermore, when the cell emulsions are kept for a very long time, the cells become resistant; hence, new cell emulsions must be made from time to time.

The serum for the reaction must not be taken during the febrile period or after eating, as otherwise it will act like serum of normal individuals, and will dissolve the cancer cells.

Finally, Freund and Kaminer considered this test of the lytic property as insufficient, and in their work have used always the precipitation test and the test of the protective power of the serum of the cancerous individual against lysis by normal serum. In their latest report they found the reaction positive in 88 per cent. of cancerous cases; they tested the serum of 113 patients with cancer, and used at least two of the three tests in every case. In no other diseases did they find the protective action to be present; although they tested the sera of cachectic tuberculous or sarcomatous individuals. It may thus be seen that the Freund-Kaminer reaction has not, up to the present, been given a fair test.

Kraus and his collaborators have shown that the serum of the blood of the placenta will not dissolve cancer cells, thus acting like the serum of cancerous patients. Furthermore, the serum of pregnant women during the last month of pregnancy shows a lessened tendency to dissolve cancer cells. Kraus and v. Graff were led to investigate this relation of serum of pregnant women to cancer cells because of the fact that in certain respects the metabolism of pregnant women is similar to that of cancerous patients.

In later experiments Kraus, Ishiwara and Winternitz have shown that the embryonal cells may, to a certain extent at least, replace the cancer cells in the Freund-Kaminer reaction, as they are not dissolved by the blood from the placenta (the fetal blood), while they are dissolved by the blood behind the placenta (the maternal blood). They do not conclude from their experiments that cancer cells and embryonal cells are biologically identical, nor that the serum of the umbilical-cord blood is identical with that of cancerous patients.

Freund and Kaminer have already pointed out the fact that the serum of the placenta, while it does not dissolve the cancer cells—thus being like the serum of cancer patients—differs from this later serum inasmuch as it does not protect cancer cells from the lytic action of normal serum.

OUTDOOR LIFE FOR CITY CHILDREN.

A REVIEW OF RECENT LITERATURE.

By ALFRED FRIEDLANDER, M. D., of the Editorial Staff.

1. Ayer: Open Air Schools and Fresh Air in Schools. (*Arch. of Pediatrics,* October, 1911.)
2. Williams: The Sheffield Open-Air School. (*British Journ. Tubercul.,* Vol. V, p. 204, 1911.)
3. Wood: Darlington Open-Air School. (*British Journ. Tubercul.,* Vol. V, p. 211, 1911.)
4. Cope: A Plea for More Physical Education in Our Public Schools. (*Journ. Missouri State Med. Assoc.,* April, 1912.)
5. Hertz: Modern Problems of School Hygiene. (*Ugeskrift for Læger,* No. 23, 1911.)
6. Carr: Outdoor Life for City Children. (*Archiv. of Pediatrics,* April, 1912.)
7. Meylan: Value of Physical Activities in the Treatment of Atypical Boys. (*Amer. Journ. of Obstet. and Dis. of Women and Children,* January, 1912.)

In a very suggestive article on fresh air schools, Ayer points out that the open-air school is not a mere fad—that it has in reality come to stay. As is well known the first of these schools was opened in Charlottenburg, near Berlin, Germany, in 1904. This forest school (*Waldschule*) was started as an adjunct to the treatment of tuberculosis. The first open-air schools in England and America were on the same basis. Gradually, however, we have come to the application of the open-air idea to anemic and malnourished school children. Latterly we are coming to recognize the fact that healthy children would retain their health better and be less apt to contract infections if at least part of their school hours were spent out of doors. It is generally admitted now that the open-air school is of inestimable benefit to the tuberculous, even to the anemic, or malnourished child. Under these circumstances the actual teaching of the child is made subservient to the more important duty of helping him to get well. But where open-air schools are established for healthy children, the school curriculum, the school schedule, must very properly receive first attention.

In the finding of satisfactory sites for open-air schools in cities, many points have to be considered. The problem is, of course, especially difficult in the congested portions of large cities where the need for fresh air for school children during school hours is greatest. The two essential characteristics of suitable locations are accessibility and protection. Two courses are open. The open-air schools may be located in parks or city play-grounds, or they may be placed upon the roofs of the regular school buildings. The use of parks and playgrounds for school purposes is only possible to a limited extent without spoiling these breathing-spots of a

city for their proper purposes. As Ayer points out, there is no reason why the roofs of various buildings should not be used for open-air schools, so that more space for such schools will thus be had. The question of elevator and fire-escapes must, of course, be considered. Under the head of protection, Ayer enumerates, as things to be reckoned with, storms, wind, dust, smoke, sun, heat and cold. Open-air recovery schools usually do not hold outdoor sessions in stormy weather, unless some form of permanent overhead shelter is provided. Indeed, in city outdoor schools, such protection must be regarded as essential. In closing, Ayer very properly insists upon the danger of letting the open-air school become a fad, and nothing more. As he puts it: "Let us encourage, in every way possible, the use of available roofs for the work and for the play of our cooped-up city children, and in the construction of all kinds of buildings in the future, let us bring our influence to bear for such a utilization of roof space. On the other hand, let us point out at every opportunity the self-evident fact that as soon as the public is educated up to a recognition of the extreme value of fresh air in schoolrooms, it will only be necessary to open the windows, or better still, to take out the window-sash, to let in all outdoors."

Williams gives an account of the open-air school campaign in Sheffield. Special attention was paid to the cleansing of the children. All children had their teeth attended to. Meals were served in an open-air shed. Special attention was paid to physical exercises. Increase in weight and in chest measurement was noted in all the children. Williams calls attention to the value of the open-air schools as an educational influence upon the parents. The necessity of sufficient rest, combined with regular plain feeding and an open-air life, was impressed upon them by the success of these methods in the care of delicate children.

In reporting the results achieved by the Darlington open-air school, Wood found that good results were indicated by increase in weight, improvement in general physique, and increase of hemoglobin. A gratifying feature was that children, examined three months after the school had been closed, showed that the improvement had been well maintained.

Cope enters an earnest plea for the physical education of the child. He holds that physical welfare of the child should receive the same care from the state that is given to the mental training. He believes that regular systematic physical examinations of the children should be given just as often as are the tests of mental proficiency. Such physical examinations should include a survey of the child's home and his general hygienic condition.

Cope believes that the municipal playground is a force of inestimable benefit for the uplift of the city child. He says that one-tenth of the city of Boston is devoted to parks, playgrounds and bathing beaches. Boston is undertaking the bringing up of its children with equal care for the body and mind. He quotes Roosevelt's statement that Chicago's great playgrounds are one of the greatest civic achievements of modern times. If the state would give the same care to the physical development and education of the child that it does to the mind, thousands of children dying from preventable diseases would be saved. Greater progress would be made in intellectual work and a higher type of citizenship would be developed. From an economic standpoint such a plan would be a success because the state spends more money to educate children who die before they reach maturity than it would cost to put this idea of physical direction and education into effect.

Such a plan would afford the best possible means of combating tuberculosis. Hertz says that the problems of school hygiene in our times are so complex that they should be under the control of public health authorities always. It is the duty of school hygienists to correlate physical and mental development. He insists, *inter alia,* upon the great importance of school sanatoria, and open-air schools, as well as clinics for the treatment of the commoner affections of school children. Carr discusses the great growth of our urban population and the problems resulting therefrom. A century ago the cities with a population of 8,000 or over represented only 3.3 per cent. of this country's population. Now 33 per cent. of our whole population lives in cities. Again, the cities are much larger now and much of the simplicity of former years has passed away. As the size of any city increases, the limitations of outdoor life, both for infants and children, are greater. The home environment of most of the children who have the use of playgrounds and parks is such as to minimize the good results that should come from the time spent in the open air, because of the restricted area of living- and sleeping-rooms.

City babies and young children should be kept in the open air except when necessary to change their clothing, feed and bathe them. Roofs, balconies and fire-escapes protected by suitable railings and nettings make excellent outing places where young children may spend their days away from the dirt and confusion of city streets. Roof gardens and open-air porches should be utilized to the fullest extent.

Growing children demand outlet for their physical activities. "The individual must combine attitudes of activity with attitudes of rest. And the attitudes of activity, as well as of rest, must be varied in character. There is an irresistible impulse on the part of the growing boy to use his muscles as part of the process of normal physiological growth. A boy who has only the street as a playground gains in every way, mentally and physically, if he has the opportunity to run, swim, play ball, and exercise in a normal, spontaneous way in the open air."

Every opportunity for such outdoor exercise should be given the city boy by the municipality. There can be no question that the confinement of city life handicaps the growing generation to an enormous extent.

Meylan calls attention to another phase of the question of the physical education of our children. He has found that boys, who show evidences of abnormality, in many cases improve tremendously when such boys are placed in a wholesome environment, with simple active outdoor life, constant supervision, and systematic physical training. Meylan is convinced that in the educational program of the atypical child, proper physical training in the fresh air plays a most important rôle.

PATHOGENESIS OF KIDNEY CYSTS.

A REVIEW OF THE LITERATURE.

By JOHN R. CAULK, M. D., of the Editorial Staff.

1. Braumworth (Virchow's *Archiv*, Bd. 186, 1906).
2. Brockenheimer (*Berl. klin. Wochenschr.*, 1911).
3. Dominici (*Fol. Urolog.*, Vol. 47, 1910).
4. Fowler (*New York Medical Journal*, December, 1911).
5. Legueu and Verliac (Supplement to *Ann. des Mal. des Org. Gen. Urin.*, 1911).
6. Letulle and Verliac (*Ann. des Mal. des Org. Gen. Urin.*, 1911).
7. Lipskeroff (*Fol. Urolog.*, 1911).
8. Nattan-Larrier (*Bull. de la Soc. Anat. de Paris*, 1910).
9. Poussoñ (*Ann. des Mal. des Org. Gen. Urin.*, 1911. Disc. at French Assoc. of Urol.).
10. Simon (*Thèse de Paris*, 1906).
11. Squier (*Annals of Surg.*, 1911).

In 1841 Willis differentiated between cysts apparently of new formation and cysts through dilatation. He does not, however, mention the cause of the dilatation. In 1844 Rujssenaers said that all cysts originated from the urinary canals, both through mechanical stoppage with retention of secretion and as a result of inflammatory processes by which the urinary canals grew together in places and the free parts continued secreting. Frerichs, in 1847, remarked that cysts originated from dilatation of the Malpighian capsule, through obliteration of the urinary canals in consequence of inflammatory processes, with obstruction of the canals. In 1851 he explained the genesis of kidney cysts by obstruction of the canals caused by plugging of the lumen with fibrinous exudate and a contraction of the newly-formed stroma in the region of the tubules. In the middle of the nineteenth century, there appeared the publications of Rokitansky, Schraut, Paget, and Gairdner, who thought that cysts were due to a rupture of the uriniferous tubules and a shedding off into the intercanalicular connective-tissue of epithelial cells which developed in the form of cysts. Rokitansky thought that cysts were formed by a metamorphosis of the cells of the Malpighian bodies, which produced cysts through pressure. Schraut believed in a colloid metamorphosis of the connective-tissue cells as a cause of cysts. Gildemeister observed colloid droplets in the epithelium of the uriniferous tubules. Albarran says that a serous cyst is a simple variety of polycystic degeneration, the cysts having united and the walls absorbed to form a single cyst. Simon states that the canals are most frequently the origin, and Bowman's capsule takes part in the general distension. Johnson gives several explanations for the origin of cyst-formation in the kidney. (1) A destruction of the epithelium of the canals through which the urine cannot be sufficiently removed from the parts of the canals which are still possible of

secreting; (2) stoppage of the canals in the neighborhood of the pyramid by substances which have been washed down from above in the region of the Malpighian body; (3) circulatory disturbances of the capillaries of the Malpighian bodies, either alone or in association with the afore-mentioned causes, which produce a cessation of the passing off of water; thus the power is lost which keeps the urinary canals patent. Klein thinks that cysts originate in the Malpighian bodies. In 1856 Virchow gave four possible origins for cyst-formation. (1) Obstruction to the straight canals with salts of carbonate and phosphate of calcium; (2) apoplectic cysts; (3) cysts in scars; (4) colloid cysts. Virchow later abandoned the theory of retention due to concretions, and believed the cysts to be caused by retention secondary to a sclerosis around the tubules in the papillæ (pyelopapillitis fibrosa). The next representative of this theory was Rayer, who thought cysts were caused by stoppage of the canals due to scar-like contractures of the connective-tissue in the papillæ.

The retention theory has many partisans. The abnormal growth of connective-tissue is the agent of the constriction; this is most common in the age of arteriosclerosis when cysts are most frequent. Severi, Guinsbourg and Hartmann accept this opinion. Newman holds a somewhat analogous opinion, but believes that the obstruction may be caused by deposits and exudation. In 1856 Albers divided cysts into those due to diseases of the Malpighian bodies and those due to diseases of the Malpighian bodies and urinary canals. He thought that, as the result of a light inflammation, the urinary canals were closed below, while there was dilatation above with accumulations of inflammatory exudate. The same year, Beckmann divided kidney cysts into (1) true cysts; (2) cysts originating in the Malpighian bodies; (3) those from obstruction of the uriniferous tubules. Concerning the latter, he says that they are nothing more than small atrophied places along the course of the urinary canal with retention of contents due to the fact that the contents are too thick to pass because the *vis-a-tergo* of the glomerulus fails as a result of atrophy. He does not think that true cysts can come from these. Neither did he believe that colloid changes could produce cysts. Hertz recognizes four kinds of cysts. (1) New formations due to an exuberant growth of connective-tissue with colloid changes of the central part; (2) cysts originating from changes in the epithelium of the gland substance itself; (3) cysts from blood extravasation; (4) true retention cysts. He does not admit the stoppage of the canals with salts as the cause of the retention. The reason, he says, that large cysts are not frequently found in nephritis is explained by the fact that the glomeruli and upper uriniferous tubules become functionless through other changes of the disease, and cease secreting. Sturm, in 1875, said that cysts originate as an adenoma. First, there is an epithelial proliferation, later fatty degeneration and cyst-formation. Simon thinks this theory untenable, as epithelium is not constant, and when present is not in a state of activity. Rindfleisch in 1878 considered all cysts the accompanying process of inflammatory conditions. About this time, Cornil, Brault, Sabourin, Mallassez, Lejars, and Goodhard were advocates of the inflammatory theory, but thought that retention alone could not sufficiently explain the cause of the cysts. They believed that there was evidently some activity of the epithelium. Thorn in 1882 remarked that the development of cysts through contraction and obstruction of the canals is definitely proved in chronic interstitial nephritis, and needs no further explanation. Leopold reported a case of a large blood-cyst which he

believed was due to retention within the canals. Weichselbaum and Greenish in 1883 thought as Sturm, that cysts may result from adenomata. In the following year, the views increased in regard to the belief that the cause of cysts was obstruction due to connective-tissue changes. The adherents at this period were Marchand, Durlach, Chotinsky, Birch-Hirschfeld, Stoehr, and Philippson. Birch-Hirschfeld leaves the question of origin of solitary cysts open, but thinks that most probably they are due to retention from plugging of the canals. Philippson thinks that cysts may originate in the glomeruli and in the canals, both from obstruction within and from without the canals. In the next year, Schmaus, Israel, von Brackel, and Forbes expressed their belief in the chronic inflammatory theory of cyst-formation. Therburg differentiated between cysts of Bright's, isolated cysts, and cystic kidney. With reference to the isolated cysts in otherwise normal kidneys, he did not commit himself. Struebing believes that large solitary cysts could not originate from stricture of the canals; their genesis, he leaves an open question. Regarding small single cysts in an otherwise normal kidney, he holds it possible that a circumscribed interstitial contracture can evoke it. Ziegler differentiates single cysts in a normal or only slightly altered kidney from multiple cysts which occur as an accompanying process of chronic interstitial nephritis. Concerning the genesis of the former, he says nothing. Arnold describes a case of congenital interstitial nephritis with cysts, and in 1895 Lust reported a similar case. Claude in 1896 regarded cysts as a specific new formation somewhat analogous to *epitheliomas mucoides* of the ovary and testicle. Singer considers the formation due to contraction caused by new-formed connective-tissue, but he thinks that for many cysts a satisfactory explanation is lacking. Some he thinks may originate in fetal life. Ribbert believes that single cysts, in an otherwise normal kidney, may be due to an arrested development. Ottendorf is an advocate of cyst-formation due to stricture of the canals from connective-tissue contraction. Aschoff says that cyst-formation must concern a special circumstance, and a uniform genesis is not determined. He seems to think that there must be some irritation producing an increased secretion.

A view entirely different from any which has been expressed was proposed by Krause in 1899. He describes a walnut-sized cyst, and says that its origin started in an early period of life when there was still present separate kidney lobules. One of the lobules served as the origin of cyst-formation. He describes obliteration of one of the branches of the renal artery with an atrophy of the corresponding lobule. Later there occurred an inflammation and fatty degeneration of the lobule which became entirely encapsulated and formed the cyst he described. Rickerts is unable to explain the origin of cysts in otherwise normal kidneys. In 1902 Hausmann explained the origin of certain cysts as related to adenoma. He observed slender papillæ in the walls of some of the cysts and called them *cystoma papillaire*. He says that a transition can be observed from an adenoma to a cystoma papillaire. The case of Squier, of recent date, of malignant adenoma of the kidney with the cyst at one pole is of a similar nature. Delbet in 1903 studied the origin of cysts and attributed many of them to trauma. Traumatic uronephroses, he says, are caused by obstruction of the canals with clots with the resulting cicatricial stricture. He thinks that what he terms traumatic uronephrosis may be serous cysts of other authors. Ruckert in 1903 remarked that all cysts of the kidney are congenital, and owe their existence to faulty fetal development. This idea is substantiated by Braumworth. They believe that the only

difference between simple or single cysts of the kidney and cystic kidney is one of degree. In 1904 Dunger opposed the congenital idea and believed, as many of the older writers, in the retention theory of cyst-formation. Kaufmann in the same year recognized three types of cysts. (1) Solitary cysts originating from arrested development in fetal life with secondary stricture processes; (2) many cysts in contracted arterial sclerotic kidneys, partly retention and partly secretory; (3) congenital cystic kidney. Lubarsch is an adherent of the inflammatory retention theory, and thinks Ruckert's statement, that all cysts of the kidney are congenital, is unjustifiable. He examined the kidneys of newborn and infants, and found cysts in 32 per cent. In the kidneys showing inflammatory changes there was a larger percentage of cysts. In 500 kidneys, in patients over fifty years of age, he found 79 per cent. of cysts, macroscopically. He says that one can only say a cyst is congenital when no other cause can be found. Thompson believes with Hildebrandt that certain kidney cysts are due to failure of union of the two canal systems in fetal life with the consequent retention of secretion.

In the more recent literature, the same diversity of opinion exists concerning the genesis of kidney cysts. Lipskeroff in 1911 stated that solitary cysts of the kidney are rare, and he collected 22 cases from the literature. This seems a small number, as Simon in 1906 collected 52 cases. Lipskeroff's case he considers of adrenal origin. About the same time Brockenheimer reported his case of large cystic tumor in a horseshoe kidney, and expressed the view that it arose from some obstruction to the canals with a retrodilatation and cyst-formation. At the meeting of the French Association of Urology at Paris in 1911, a symposium held on kidney cysts evoked the same unsettled state of affairs concerning the origin of renal cysts. Letulle and Verliac defended the theory of congenital malformation as the origin of most cysts, while Pousson supported the chronic inflammatory theory with retention.

THE X-RAY THERAPY OF ENLARGEMENT OF THE THYMUS GLAND AND STATUS LYMPHATICUS.

A REVIEW OF RECENT LITERATURE.

By E. H. Skinner, M. D., of the Editorial Staff.

1. D'Oelsnitz and Paschetta: Roentgenoscopy of the Hypertrophy of the Thymus. (*Bulletin de la Soc. de Pédiatrie*, Vol. XIII, No. 9, p. 470, December, 1912.)
2. Friedlander: Involution of the Thymus by Roentgen Ray. (*Archiv. Pediatrics*, Vol. XXVII, p. 805, October, 1911.)
3. Heineke: Influence of Roentgen Rays upon Lymphoid Structures. (*Mitt. a. d. Grenz. d. Med. und Chir.*, Bd. XIV, h. I-II.)
4. Lange: X-Ray Therapy of Enlarged Thymus. (*Amer. Quart. Roentgen.*, Vol. III, No. 1, p. 1, April, 1911.)
5. Rachford (*Amer. Journ. Med. Sciences*, Vol. 140, No. 4, p. 550, 1910).
6. Ribadeau-Dumas (*Semaine Médicale*, April 3rd, 1912. Abs. *New York Med. Journ.*, p. 813, April 20th, 1912).
7. Regaud and Cremieu (*Lyon Médicale*, Vol. CXVIII, No. 1, January 7th, 1912. Abs. *Journ. Amer. Med. Assoc.*, February 24th, 1912).

It is satisfactory to find in a new department of medicine—radiology— a pathological entity, the therapy of which has been established by experimental animal research, verified by clinical experience, and proved by the subsequent observation of the cases.

The intimate relationship of the enlargement of the thymus gland and status lymphaticus seems to be established. Lange, however, offers the enlarged thymus as a separate entity. It seems, though, that roentgen therapy may be legitimately and successfully applied to both cases presenting only thymic enlargement, and to those to which are added the general distribution of lymphoid enlargements with the concomitant blood changes.

Heineke furnished the early information concerning the influence of the x-rays upon lymphoid structures. He found that the x-ray exerted a selective (?) action upon lymphoid tissues, including the thymus gland, producing a reduction in size, etc. He observed the deleterious action of the x-rays upon the hematopoietic organs by exposing small animals to strong irradiations. Heineke found in the spleen that cellular modification commences a few hours after the first irradiation, reaches its height in from eight to twelve hours, resulting in a complete disappearance of the follicles in twenty-four hours. These modifications consist in the death of the lymphocytes of the follicles and the breaking up of their nuclei, the debris of which falls prey to the phagocytes, and rapidly disappears. Analogous destructive processes are observed in all the lymphatic glands, in the follicles of the intestinal canal and in the thymus

gland. In the bone-marrow and in the splenic pulp, these changes do not commence until after a period of latency lasting several days.

It was upon the exhaustive researches of Heineke, which have been but too briefly quoted, that Friendlander based his first case of thymic enlargement. The latter considers the x-ray of great therapeutic value; and in cases of enlarged thymus with concomitant symptoms of splenic enlargement he was able to secure the reduction in size of the spleen and other lymphatic nodes even when the x-ray was applied to the thymus alone. The x-ray changed the high lymphocytic blood-picture to normal. He considers that there are no ill effects from the x-ray, and that it is far safer than thymectomy. He has one case that has been well over six years.

Friedlander's first case had such symptoms of status lymphaticus as an enlarged spleen; and lymph glands were present in addition to the inspiratory stridor, asthmatic attacks, with the abnormal area of dullness over the upper part of the sternum. Nine x-ray exposures were given over a period of three weeks; the symptoms subsided promptly, and the child has developed normally.

Ribadeau-Dumas reports an infant attacked with dyspnea and threatened suffocation from an enlarged thymus where the x-ray was employed because the mother opposed surgery. Excellent results were obtained as early as the second treatment. The child succumbed to an intercurrent attack of measles, and the autopsy revealed the thymus gland diminished in size. He advocates the x-ray in preference to surgical removal of a portion of the thymus gland.

In addition to the use of the x-ray in the treatment of thymus-gland enlargements, it is also of great value in supporting the diagnosis both by fluoroscope and radiograph. All the writers quoted speak of this x-ray value, but more especially do D'Oelsnitz and Paschetta. As minor signs of latent hypertrophy of the thymus they mention the puffy and pale appearance of the child—the cyanotic complexion—a persistent or intermittent or merely bluish tint about the mouth. The veins upon the skull become dilated and prominent. The eyes exhibit a stare, protrude and are sluggish. The fontanelles are taut and show hypertension. There is interference with the return circulation of the skull. Respiration is labored, and the stridor is accentuated as the child reclines. These signs are fleeting and variable, but the diagnosis is made certain by the unusual extent and intensity of the dullness over the manubrium, especially toward the left. The normal thymus does not cast a shadow wider than the manubrium; therefore any increase of shadow to the left suggests an enlarged thymus gland, but this shadow must have a sharp outline. D'Oelsnitz and Paschetta have examined some thirteen infants a few days old and found two with the x-ray outlines of enlarged thymus. They have treated 3 cases of enlarged thymus by irradiation, with satisfactory results.

Pancoast (discussion of Lange's article) says that if we are treating lymphoid structures which respond to x-ray treatment in an unusual way, as is the case in lymphoid enlargements occurring in leukemia, there is a very rapid destruction of that lymphoid tissue, and we must be very careful of our dosage. We are treating infants, and toxemia in infants is a very dangerous matter. Therefore, be careful how you treat these cases. Prolonged or severe radiation may produce a toxemia which will prove overwhelming and terminate in the death of the patient.

Manges (discussion of Lange's paper) reports a case of enlarged thy-

mus in an infant in which he gave short exposures at some distance with a filter with good results. He treated the child two months, twice a week. After three months the mother returned the child for a few more treatments because of a slight wheezing. The child has continued in good condition.

Johnson (discussion of Lange's article) reports an interesting case of a child who presented a definite picture of thymic enlargement with a history of croupy cry since birth. There was not, however, the history of progressive enlargement of the thymus with the usual systemic manifestations. The x-ray plate failed to show an enlarged thymus shadow upon either side of the manubrium. There was a faint shadow which seemed to be extensive and resembled a mediastinal growth, but it was too high up in the neck to be such a growth. The child grew progressively worse, so that an operation became necessary. When the surgeon made his incision and began to dissect back to the side of the larynx, about two ounces of pus was evacuated from a congenital (?) post-laryngeal abscess. The child made a rapid recovery.

Rachford holds that in the x-ray treatment of status lymphaticus in infants and young children, although no portion of the body is exposed to the influence of the rays except that which directly holds the thymus gland, we have as a result of the treatment:—

(1) Decrease in size of the hyperplastic thymus, with the disappearance of the cough, stridor and asthma.

(2) Decrease in size of the enlarged spleen and lymph-nodes.

(3) The exhaustion and general feebleness of constitution gives way to normal conditions of health and strength, and physical and intellectual growth are greatly stimulated.

(4) A rapid disappearance of the marked lymphocytosis which characterizes the disease.

(5) Excessive physiological action of the thymus gland is controlled.

Rachford also considers that the disappearance of the lymphocytosis under the x-ray treatment of the thymus gland is so marked that a careful study of the blood-state in this condition will give important information as to the efficacy of the treatment and the length of time to continue it. It may be wise to discontinue treatment when the lymphocytosis disappears even if the cough and stridor remain. He suggests the hyperdermic injection of iron with careful feeding and fresh air after the x-ray treatment. Rachford reports 2 cases which are also included in Lange's series.

Lange reports completely 4 cases of simple enlarged thymus without any symptoms of status lymphaticus. He also mentions 3 other cases. All the cases were characterized by enlarged thymic dullness to the left of the sternum, which was corroborated by the x-ray negative in each case. Most of his cases receive treatments of short duration over the chest and back at the site of the thymus gland two or three times a week for six weeks to two months. If there was recurrence of untoward symptoms, the cases were returned for one or two exposures with good results. "Upon considering the tendency to recurrence after x-ray treatment in each case, and noting the experiments of Rudberg showing rapid regeneration following irradiation, it would seem that the x-ray exposures were given too conservatively in these cases. The vague fears of the mother as to the possible harmful effects of the ray, which fears are not frequently shared by the physician, often cause the x-ray operator to err on the side of conservatism, to treat too lightly and discontinue the treatment too soon."

Lange feels that "in view of the difficulty often encountered in the diagnosis of thymic enlargements, and in view of the prompt action and harmlessness of a few x-ray exposures, that roentgen therapy may be rationally employed as a therapeutic test in obscure cases."

The possibility of thymic atrophy from prolonged x-ray exposures has given Lange no fear; and he feels that if it did occur it would not affect the human economy. Koenig (reported by Rachford) advised against complete thymectomy in the operative treatment, as in an infant of nine weeks there developed rickets with failure to walk for four years.

Regaud and Cremieu experimented upon some forty cats and found that the thymus disappeared after strong exposures. All the experimenters have found that after a short time, however, there is a regeneration of the glandular elements; hence, we may infer that it would take more treatment than we would ever inflict upon an infant to produce any untoward effects. The suggestion of Rachford regarding the attention to the blood-picture as a guide to the amount of treatment is very serviceable.

We may conscientiously recommend, therefore, that cases of enlarged thymus with or without status lymphaticus be subjected to x-ray exposures with more or less certainty of results.

DIAGNOSTIC AND THERAPEUTIC NOTES.

LUMINAL, A NEW HYPNOTIC.—Geissler (*Muench. med. Wochenschr.*, No. 17, 1912). Luminal, or phenyl-ethyl-barbituric acid, is closely related to veronal, differing from the latter only in the substitution of a phenyl radical for an ethyl group. It was discovered by Hoerlein, tested pharmacologically by Impens, and is manufactured by Bayer & Co. A modification, called luminal-sodium, is readily soluble and suitable for hypodermic use. The dose varies from 0.2 to 0.6 grm., the smaller doses being suitable for simple insomnia, the larger for maniacal conditions. The latter are most effectively treated by means of the subcutaneous method. It appears to be a prompt and efficacious hypnotic, to have no unpleasant after-effects, to irritate neither stomach nor kidneys, and to be nearly tasteless. The results of its use in the Cologne psychiatric clinic indicate that it is destined to a considerable extent to replace veronal.

A NEW STAIN FOR DIPHTHERIA BACILLI.—Raskin (*Deutsch. med. Wochenschr.*, No. 13, 1912). The usual methods for the differentiation of the polar bodies of diphtheria bacilli are complicated or at least require the use of several staining or decolorizing solutions. A stain recently devised by Marie Raskin has the advantage of extreme simplicity. A spread is made from the suspected tonsil, or the culture, and fixed in the usual manner. It is then covered with the following stain:—

Glacial acetic acid	5 c.cm.
Distilled water	95 c.cm.
95 per cent. alcohol	100 c.cm.
Old saturated watery solution of methylene-blue	4 c.cm.
Carbol-fuchsin	4 c.cm.

The cover-glass, covered with the stain, is passed through the flame, thus setting fire to the alcohol contained in it. A few seconds later, the preparation is washed, dried and mounted. The bodies of the bacilli take a pale pink color, the polar bodies dark blue. The critical point seems to lie in the use of a sufficiently old solution of methylene-blue. Miss Raskin, herself, uses one five years old. If a more recent solution is used, the bacilli stain pale blue instead of pink, but even then the stain is a useful one (Goetze, *Muench. med. Wochenschr.*, No. 17, 1912).

FEVER IN HYPERTHYROIDISM.—Stern (*Berl. klin. Wochenschr.*, No. 12, 1912). In many cases of hyperthyroidism, a more or less continuous fever is one of the earliest signs. It is much more frequent in the milder forms of the disease than in outspoken exophthalmic goitre, but is usually overlooked. It is well to consider the possibility of a thyreotoxic cause of any fever in which, in spite of the absence of any demonstrable or-

ganic lesion, there is a steady loss of weight. In such cases, the cautious administration of iodides or of thyroid preparations will cause the appearance of definite symptoms of hyperthyroidism and so serve to clear up the diagnosis.

PHENYLDIMETHYLPYRAZOLONAMIDOMETHANSULPHONATE OF SODIUM.—Lœning (*Muench. med. Wochenschr.*, Nos. 9-11, 1912). Lœning expresses himself enthusiastically concerning a new antipyretic and antirheumatic prepared by Meister, Lucius and Bruening. It is a white powder, very soluble in water, possessing antipyretic power in doses of 0.5 to 1.0 grm.. and non-toxic in doses of 8 grm. daily. It acts as specifically as the salicylates in acute articular rheumatism, without irritating the stomach and without producing sweating. It may also be used in endocarditis. Relapses seem to be less frequent with its use than with the salicylates.

TREATMENT OF PRURITUS ANI.—Rave (*Deutsch. med. Wochenschr.*, No. 16, 1912). Pruritus ani, hitherto one of the most intractable of afflictions, yields readily to the *x*-rays. The patient takes the knee-elbow position, or bends over holding the buttocks apart with his hands. A soft tube is used, encased in a lead box with a small opening, the scrotal contents being further protected by lead foil. For the technical details the reader must be referred to the original article. A few exposures suffice for a symptomatic cure, though the procedure usually has to be repeated after three or four weeks. The results reported were so good that, if they are confirmed by other observers, we would seem at last to have a remedy for this most distressing affection.

SALICYLIC OINTMENT IN RHEUMATISM.—Scharff (*Therapeut. Monatshefte*, No. 2, 1912). The value of various salicylic preparations such as oil of wintergreen, salicylic acid ointment as well as a number of proprietary preparations, when applied directly to rheumatic joints, is generally conceded. Scharff especially recommends the following preparation:—

  ℞ Acidi salicylici............................10.0 solve in
   Ol. terebinth. 10.0
   Sulfur. præcip. sive sublim.
   Terebinthinæ āā................................. 40.0
   Misce.

The ointment is spread over the affected area and covered with an occlusive dressing. If the skin is very sensitive, the latter may be replaced by an ordinary bandage or the ointment dusted over with flour or talcum. After three to five days the application may be renewed. If a dermatitis results an ichthyol zinc paste may be substituted for several days. It may be well to add that the last item in the prescription is not the oil but the gum of turpentine. The mixture should make a stiff and adhesive, but perfectly homogeneous, paste.

CALCIUM SALTS IN BRONCHIAL ASTHMA.— Kayser (*Therapeut. Monatshefte*, No. 3, 1912). In 13 cases of bronchial asthma, good results were obtained from the following preparation:—

℞ Calcii chloridi. 20.0
  Syrup. simpl. 40.0
  Aq. dest. ad. 400.0
  Misce.
Sig.: One tablespoonful every two hours in milk.

After three days the attacks became less marked and sometimes ceased for a period of several months. In general, the patients observed that early in the treatment the mucus became more fluid, respiration freer and sleep less disturbed. In two cases the treatment remained ineffective. Unpleasant effects were not observed.

NORMAL TEMPERATURE IN CHILDHOOD.—Williams (*Lancet*, May 4th, 1912). In routine examinations of 1,000 school children, Williams obtained the following results regarding normal temperatures in childhood. Only 13.5 per cent. had temperatures under 99° F., while 55.5 per cent. had 99.6° F. or over. There was no difference between the sexes.

CHRONIC INTESTINAL STASIS.—Lane (*Brit. Med. Journ.*, May 4th, 1912). In a discussion of the far-reaching deleterious effects of chronic intestinal stasis, Lane advances the opinion that it is a predisposing factor in both in the production of tuberculosis, rheumatoid arthritis and cancer of the breast. The mechanism of the stasis is the production of a kink at or near the ileocecal junction, through adhesions formed in the peritoneum, a ligamentous action of the appendix, or through overloading of the small intestine which falls into the pelvis and is constricted as it passes over the brim to reach the cecum. In some cases there is much pain, distension, tenderness and vomiting, while in others there may be no complaint whatever. This does not make the stasis any the less deadly in its poison-producing effects. Ulcerative or mucous colitis may result, or infection of the pancreatic and biliary ducts with the development of gall-stones, pancreatitis and even of cancer of the liver, pancreas, stomach, or duodenum.

The treatment may be operative or non-operative. The latter consists in the administration of liquid paraffine, to facilitate the passage of the intestinal contents, and in the wearing of a suitable abdominal support. Surgical interference consists either in dividing the constricting ligament or adhesions, or, if there is great intestinal atony, in dividing the ileum and inserting the proximal end into the colon below the last kink. In every case of tuberculous or rheumatoid arthritis, in which the usual treatment has failed, the bowel should be short-circuited without hesitation.

OVARIAN GRAFTING AT THE ARTIFICIAL MENOPAUSE.—Engel (*Berl. klin. Wochenschr.*, No. 21, 1912). Engel reports a case of a woman who had been castrated for local reasons and in whom psychic alterations set in. An ovary from a myoma castration was implanted into her vagina, being buried beneath the mucosa near the cervix. During the next few months, her condition improved steadily and complete restoration to health resulted.

CORRESPONDENCE

PARIS LETTER.

ARTHROPATHIES AND TABES.

By Auguste A. Housquains, M. D.

The last few years have witnessed an astonishingly rapid transformation in our classical conceptions of medical doctrine. The questions, which have been most profoundly affected by inquiry, are, without doubt, those in regard to the glands, the internal secretions, and hematology. Diseases of the nervous system have likewise been the subject of a revision that has modified, in many respects, our previous conception; and to prove this let me cite the overthrow of the theory of hysteria, such as was conceived by Charcot, and the transformation of the question of aphasia, as described by Broca.

A brochure, recently published by the Faculty of Paris as the inaugural thesis, has for its plea that the strange osteo-articular disorders, which are observed in tabetics, should be submitted to a total revision; and without wishing to prejudge the future value of this conception of these disorders, it appears that we are on the eve of a transformation of this question. Doubtless, the author, M. Barré, who is just beginning his career, has not been able to mature his theory sufficiently, therefore his essay lacks certain points of experience; but it is important to note that it is prefaced by M. Babinski whose competency and authority in the matter of neurology cannot be questioned. In fact, it can be said in all certainty that the eminent physician of the *Hopital de la Pitié* was the real actuating agent.

It is hardly necessary to recall here the classical conception of those special arthropathies which appear in the course of tabes, more particularly in the beginning. We know that these arthropathies appear suddenly, that they affect most often the knee, which becomes enormous in a few days, and that they manifest themselves by considerable osseous deformities. The laxity of the ligaments of the knee-joint not only allows a swelling which, on account of its size, seems at variance with what should take place, but there is no suffering on the part of the patient. It is admitted that these articular troubles are trophic manifestations which have their origin in an alteration of the nerves. But the authorities are not in accord as to the seat of the nerve lesion; for while Charcot thought that there was an alteration in the cells of the anterior horns of the cord, an opinion which he abandoned later on, Déjerine is of the opinion that the articular disorders have their origin in lesions of the peripheric nerves, and Marinesco believes them to be a trophic reflex. Without enumerating all the hypotheses which have been advanced in explanation of the appearance of tabetic arthropathies, one is justified, nevertheless, in saying that the variety of these explanations shows that not one is of absolute value.

An important characteristic of the tabetic arthropathies, which should be mentioned here, and which until now was considered the most serious feature in these cases, was the extreme gravity of the prognosis. We know, in fact, that no medical treatment was considered of special benefit and that even the mercurial therapy was ineffectual. But the theory recently advanced by M. Barré does away, for the most part, with the old ideas; and, though some of his ideas may be contested, their originality cannot be questioned. M. Barré does not doubt the possibility of arthropathies appearing in the beginning of tabes, but he says that arthropathies, which perfectly resemble those of tabes, can be encountered in subjects absolutely free from all symptoms of tabes, subjects who are only syphilitic. Nine cases studied by this author lend support to this conclusion. These cases were closely followed; not one of them presented the Argyll-Robertson sign; the tendon reflexes were normal, there was no ataxia, no sensory, motor-ocular, or sphincter disturbances; and, finally, the cephalorrhachidian fluid was absolutely normal. Radiography, of the arthropathies present in these patients, was then made; and by comparing, for example, the shoulder of an arthropathy in a tabetic with an arthropathy in a syphilitic who is not a tabetic, it can readily be seen that there is a perfect resemblance between the two. Hence, the conclusion that must be drawn is that arthropathies of a tabetic type are present in cases where there is no tabes. These facts are not exceptional, and M. Babinski has reported a similar case before the Paris Neurological Society.

A certain number of analogous cases have often been reported in medical journals by writers who attributed arthropathies to tabes in spite of the fact that tabetic symptoms were absent. But the question may be asked, Why do we encounter tabetic arthropathies principally in tabetics at a time when tabes is not in an active state? In reply to this question, M. Barré says that because we have been told that arthropathies will be encountered in the course of tabes, we invariably attribute them to this cause. Moreover, says this author, the reason, why neurologists have not in the past more frequently noted that patients with arthropathies of a tabetic type are without tabes, is due to the fact that patients of this sort are sent to the surgical clinic precisely because they do not present tabetic symptoms. The theory that these cases are monosymptomatic tabes will lose ground more and more every day so soon as the study of these cases becomes more rigorous. There exists no pathognomonic sign of monosymptomatic tabes, though it should be understood that a patient afflicted with arthropathy of a tabetic type can become, in the long run, a tabetic; but this does not prove that the arthropathy that he presents is a manifestation of tabes. There may be tabes, and even grave amyotrophic tabes, without arthropathy, just as there can be arthropathy of a tabetic type without tabes. The union of these two facts establishes schematically the independence of tabes and arthropathy.

An objection to M. Barré's conception is, that one can make an exact deduction from the inertness and the exaggerated articular laxity,—signs which are found nowhere except in tabetic arthropathy. M. Barré recognizes the importance of this statement. Beyond a doubt, says he, the arthropathy of the tabetic is often accompanied by inertia, but not always; beyond a doubt, the articular laxity is very great; but the inertia counteracts the intense sensory disturbances which characterize tabes and the laxity is caused by the tabetic muscular hypotony. Inertia and laxity are the signs of tabes and not the signs of arthropathy. The arthropathy of the tabetic has characteristic and collateral signs; in short,

a clinical combination. According to the author there are two principal clinical forms of arthropathy:—

1. The arthropathy of the tabetic.
2. The arthropathy of a tabetic type but without tabes supervening in syphilitics.

Now what is definite in an arthropathy heretofore called tabetic? The following is M. Barré's answer to this question:—

Two patients who have arthropathy, one of whom is a tabetic and the other presenting no symptoms of this affection, have one thing in common: both are syphilitic. But syphilis has, as one knows, a very marked tendency to produce vascular alterations and diminish the calibre of the middle-sized and smaller vessels. M. Barré asks if the lesions from syphilitic arteritis would not be the basis of the articular trophic troubles, as he has been able to prove that, in a certain number of joints, the articular vessels and the nourishing vessels of the bone were affected with syphilitic lesions. Accordingly, the arthropathies called tabetic are not of nervous origin; they are secondary to the syphilitic lesions of the nourishing vessels of the articular extremities.

It is this vascular theory, based on numerous anatomo-clinical facts, that M. Barré opposes to the old theory which had it, that the nervous system alone was the activating cause of the alteration in the nutrition of the bone. An objection to be made to this conception is that in certain affections, such as syringomyelia, an affection that is non-syphilitic, there can exist arthropathies similar to those of tabes. M. Barré's rejoinder is as follows: Contrary to what has been taught us, syphilis frequently exists in patients who have syringomyelia, and it is because some of these patients are syphilitic that there are present articular disturbances similar to those of syphilitics and tabetics.

An attempt has been made in this letter to outline the conception of M. Barré as to the arthropathies which we encounter in the course of tabes. As can readily be seen, his theory is not devoid of interest. His arguments are numerous, logically deducted, and well co-ordinated. Undoubtedly, the absence of a wide experience, on the part of the author, detracts at present from the full value of the theory, but the support of M. Babinski augurs well for its future. Moreover, the theoretical ideas which are advanced are strengthened by a therapy which has proved efficacious. If an arthropathy of the tabetic type is a nutritive trouble of the osseous epiphyses, directly connected with syphilis, one should, according to M. Barré, have recourse at once to mercurial treatment, and in particular to intravenous injections. Certain patients in this condition have already been submitted to this therapy and their arthropathies were greatly benefited.

June 10th.

GAS ON THE STOMACH.

To the Editor of the Interstate Medical Journal.

Sir,—Under the caption, "gas on the stomach," Dr. Thomas Wray Grayson publishes an entertaining paper on page 1563 of the May 25th issue of the *Journal of the American Medical Association.* Following out his line of thought, we should throw out our acids and use only alkalies in the treatment of all gastric disorders not due to an organic lesion.

But the writer believes that a little consideration would convince most of us that his statements are too sweeping. For example, while we may agree with him that in the majority of cases the source of gastric distention is atmospheric air, yet we cannot follow him when he says that in 99 out of 100, or in any similar large proportion of healthy individuals, the air swallowed with the food escapes upwards through the cardia. Nor do we agree with him that hyperchlorhydria is present in the great majority of the cases of gas distention.

Dr. Grayson's article is very similar to the thought expressed by Dr. Cabot on page 282 of his "Case Histories in Medicine": "Of the drugs supposed to help stomach troubles, I have very little confidence in any but the alkalies (such as sodium bicarbonate) which relieve the pain of peptic ulcer, carminatives (pepper, ginger, peppermint) which bring up "wind," and bitters which stimulate appetite. Pepsin, I believe to be useless and hydrochloric acid nearly so. The drugs formerly used to check fermentation are falling into disrepute, since we have begun to realize that "gas" and "wind" in the stomach are generally due to cribbing, rarely to fermentation. In genuine fermentation such as complicates gastric stasis from any cause, lavage is far better than any drug."

We need not depend upon the older empiricists for a check on this statement but may find it in modern experimental research. For example, the work of Walter Cannon has shown that an acid reaction in the stomach contents closes the cardiac and opens the pylorus. His work—as does that of foreign observers—shows that the gastric movement, in the normal individual, gives every inducement to "gas" to move downward through the pylorus.

Therefore, it would be a truer statement of the matter to put it thus: In the normal individual the swallowed air may escape downward or upward. In the majority of people, probabilities favor the downward route. If now there is an excess of acid, the cardia is closed and the pylorus open, and the escape upwards is shut off. In such cases relief comes only by free bowel evacuation or by the giving of diluents or neutralizers that permit the cardia to open and the gas to be eructated. If, on the other hand, there is a lessened acidity or an atony, then the escape downward is shut off and the patient must belch all the accumulated "gas" upward through the cardia.

This statement makes the problem more complicated—and more as it is in actual life. Thus in cases of gastric cancer, with an acidity, the patient belches almost constantly. On the other hand, in ulcer with hyperacidity there is seldom belching, and that only after taking some diluent or neutralizing fluid. In the simpler functional disorders the same principles hold good. Therefore, the writer finds a distinct need for hydrochloric acid. Atony is not nearly so rare as Dr. Grayson's article would lead us to believe. The real point is to detect the actual condition in the given case, and not to treat our patients according to sweeping generalizations. In short, the writer's contention is that there is need for the acids as well as for the alkalies in gastric therapeutics, the more so since we cannot use the tube and hygienic therapy in a discouragingly large proportion of our cases.—I am, etc.,

<div style="text-align:right">GEORGE HOWARD HOXIE.</div>

Kansas City, June 4th.

OBITER DICTA FROM FOREIGN JOURNALS.

EHRLICH'S MODIFICATION OF SALVARSAN.

The following translation is an extensive excerpt from Dr. A. Stuehmer's article "Clinical Experience with Neosalvarsan" which appeared in the *Deutsche Medizinische Wochenschrift*, No. 21, 1912. Dr. Stuehmer is Second Physician (Service of Dr. Schreiber) to the Department of Internal Diseases and Syphilis, Sudenburg-Magdeburg Hospital, hence is in a position to speak authoritatively on the subject of neosalvarsan. In connection with Dr. Stuehmer's article it would be well for the reader, who is interested in this preparation, to read "Le Néosalvarsan" by Drs. A. Lévy-Bing and L. Durœux in the *Gazette des Hôpitaux* of June 11th, 1912:

The modification of salvarsan, now termed neosalvarsan, has been under investigation in Schreiber's clinic for some time. In October, 1911, it was introduced into the therapy of syphilis, after it was prepared according to Ehrlich's directions. It goes without saying that great care was exercised at the outset to use small doses, and they were increased gradually only after a permanent substance of uniform composition was obtained.

This substance, which has received the name "neosalvarsan," is a true derivative of salvarsan. According to Ehrlich's communication it is a condensation product of formaldehyde sulphoxylate of sodium (CH_2-$(OH)O.SO.Na$) and salvarsan. The peculiarity of this salt of pairing with the chlorhydrates of various bases was already known. The reaction comes about thus:—

$$R.NH_2 + HO.CH_2O.SONa—R.NH\ CH_2OSO.Na + H_2O.$$
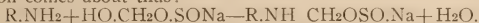
As salvarsan contains two amido groups, one or two residues of the salt may appear according to the method pursued in the experiment. Neosalvarsan represents the mono-product.

In regard to the genesis of the combination, Ehrlich had noted years ago that, in his chemical investigations of the formaldehyde sulphoxylates, readily soluble products were formed. About a year ago he resumed these studies, because the *Hœchster Farbwerke* were striving to prepare readily soluble and neutral reacting derivatives of salvarsan. His attention was directed to formaldehyde sulphoxylate on account of his knowing that this combination stops the auto-oxidation of alkaline salvarsan solution for a certain length of time. Thereupon, Ehrlich studied more closely the relation of the sulphoxylate to salvarsan, and found that by combining these, a readily soluble neutral solution could be obtained, which, in animal experimentation, exerted a considerably more powerful action on trypanosomes than did salvarsan by itself.

For clinical investigations with neosalvarsan, there was in the hospital a large number of syphilitics in various stages of the disease. The first attempts with neosalvarsan were made intramuscularly and then, as was the case with salvarsan, the intravenous method was followed.

The preparation of the new solution, unlike the complicated method which the preparation of salvarsan demands, proved to be extraordinarily

simple. The dry powder is so readily soluble in water that, to effect its complete solution, all that is necessary is to sprinkle the amount required on the surface of the water. It hardly requires more than shaking, to say nothing of mechanical devices, in order to produce a perfectly clear solution ready for use. The powder is dissolved in 200 c.cm. fresh distilled water; and what should be emphasized here is that the solution was invariably used directly it was made. Diluting with physiological saline solution should be done away with, for such solutions become cloudy and show a heightened toxicity in animal experimentation. The most desirable, at present, is a 0.4 per cent. sodium chloride solution, though very good results were obtained in the beginning with distilled water. It is to be noted that the solution was invariably used at room temperature. Experience with salvarsan has shown that all injections, in which large quantities of fluid are used, are best borne at a temperature of 18-25° C. With neosalvarsan, on the other hand, the subsequent warming of the solution must, under all circumstances, be omitted, since warming would cause injurious oxidation-products to appear.

A further simplification of the preparation of the new solution over that of salvarsan is found in the fact that it is entirely unnecessary to neutralize with soda lye, the solution already possessing a neutral reaction. The fact that soda lye is unnecessary for neutralization is an advantage which cannot be overestimated. It is an indisputable fact that the soda lye of the shops was to blame for the imperfections noted by practitioners in the preparation of salvarsan. Beyond a doubt, only in a small percentage of the soda lye formulæ, though "normal soda lye" is expressly asked for, is the latter actually present. An idea of the mischief that is perpetrated may be gleaned from the fact that potash lye, ammonia, and even methylalcohol are substituted for soda lye. But from all these untoward occurrences we are now protected; for in the preparation of neosalvarsan only a sterilized glass vessel and freshly sterilized distilled water are required. As has already been mentioned, 0.6 to 1.5 grm. of the preparation is dissolved in 200-250 c.cm. water, a slightly hypotonic solution being obtained. This slight hypotonia is, however, practically without significance in intravenous injection. In the syringe which was used in the clinic, a slight change in the color of the blood was noticed when it came in contact with the solution. It changed to blue-red, but the red corpuscles were not destroyed, if the solution did not remain too long in the syringe.

The technique of the injection is the same as with salvarsan. The syringe is used because of its simplicity. Whichever method is followed, whether the intramuscular or intravenous, the preliminary and subsequent injections of a saline solution need cause no anxiety in regard to the local formation of infiltrates as was the case when the strongly alkaline salvarsan was employed. Neutral neosalvarsan, when injected beneath the skin in moderate amounts, is followed by no infiltrate worth mentioning; and the destruction of the veins, observed after injections of the strongly alkaline salvarsan solutions, occurs but seldom with the new preparation.

In regard to the dosage, caution was necessary in the beginning. However, it was not long before the results of animal experimentation were confirmed, these showing in every case that the toxicity was no greater that with salvarsan. On the contrary, the conviction grew that the remedy was considerably better borne than the old preparation, and even in greater doses; the initial very small doses 0.3 to 0.4 grm. being increased to 0.6, 0.8, 0.9, 1.2, 1.5 grm.

In regard to dosage, it must be borne in mind that, according to its chemical composition, neosalvarsan contains only 66 per cent. salvarsan. Hence, the calculation should always be on the basis of salvarsan when the amount of neosalvarsan is being reckoned. 1.5 grm. neosalvarsan is equal to 1 grm. salvarsan. With the idea in mind that large doses were better than small doses, it was not long before it was the custom in the clinic to inject four doses of 1.5 grm. each, serially (always between days), provided the patient was strong. Even with these large doses no serious complications were evidenced aside from frequent medicinal rashes. The dosage of the new remedy should be as follows: In recently acquired cases, the most energetic treatment possible should be carried out at once. In unretarded chancres, the first injection should be 0.9 grm., after which the practicability of excising the chancre should be considered; then in succession, at one day's interval or more, 1.2, 1.35 and 1.5 grm. should be injected. In women and delicate subjects it is advisable to begin with smaller doses, say 0.6 to 0.75 grm., and then increase at a rate in conformity with the clinical course of the disease and the general condition of the patient. It is of the greatest importance, as regards dosage, that the manifestations of the disease, and, what is more to the point, the physical condition of the patient be carefully considered, for at times the doses should be small and given with great caution, while in other instances a very energetic course, with the largest doses, may be followed with impunity.

Special caution should be taken with patients presenting evidence of specific meningitis (headaches), or any other nervous affection which may be dependent on syphilis. Not only the general reaction, but also local reactive phenomena, occasionally observed—swelling, edema around the disease-focus—may give rise in such cases to very threatening symptoms, even after moderate doses have been used; and under certain circumstances death has resulted. On account of our heightened interest in the question of neuro-relapses after salvarsan in the nervous manifestations of syphilis, even in the earliest stages, our knowledge of these phenomena has been essentially increased, and we may now regard the assumption as established that, in a degree much greater than had been supposed, early mild cases of syphilitic meningitis occur. A careful consideration of all symptoms pointing to such lesions, especially the headaches complained of by these subjects, may protect us from gross errors in dosage. It is evident that a large percentage of the accidents described in connection with salvarsan will be avoided so soon as a greater degree of attention is paid to dosage. In all such cases, and especially also in cerebrospinal syphilis, and in tabes and paresis—diseases to some extent feared—0.15 grm. was given cautiously; and at eight-day intervals the dose was increased to 0.35, 0.6, 0.75 grm., the increase being practised only when the injections were well borne. Proceeding thus with caution, the records of the cases in Schreiber's clinic show no mention of threatening phenomena; a fact which illustrates that the aforementioned conditions were not regarded as contraindications to the use of neosalvarsan.

What are then the contraindications? By reason of the wide experience with salvarsan in Schreiber's clinic in the last two years, it can be said in this connection, that the contraindications, as regards the use of neosalvarsan, were restricted to the smallest possible number. Of course, when there are any grave affections which threaten life—advanced nephritis (nonspecific), myocarditis, the worst forms of arteriosclerosis, and high fever—treatment should not be attempted. But it should not be forgotten that by paying attention to the dosage, the limitations of the new preparation may be widely extended.

In all, there were available for study some 340 patients, in various stages of syphilis, who received 1,400 injections. These cases included a few with unretarded chancre, but more with retarded chancres. The majority of the cases, however, were florid secondary syphilis, and only in a small number of cases did we see tertiary or metasyphilitic affections whilst the patients were under observation.

In every instance, just as was the case with salvarsan, there was a prompt retrogression of the symptoms. The clinical course of each patient resembled what takes place when salvarsan is injected. Occasionally the impression received was that the retrogression of condylomata, for example, occurred more promptly, but this statement is not given as a fact, as it was not possible to make comparisons.

The spirochætæ were studied in a large number of cases in the same manner as heretofore. Condylomata or ulcers which before the injection contained innumerable spirochætæ were free from the parasite after the first twenty-four hours. Only in one case of unretarded chancre, where the Wassermann reaction was still negative, were moving spirochætæ found after twenty-four hours, along with other formations previously not noted (thin threads without pronounced convolution). Similar pictures had been seen before under salvarsan; and, in the present series, in one case of retarded chancre, this was noted as early as four hours after injection, at the time of the typical temperature rise and the Herxheimer reaction. While one should not place too much value on single observations, these seem, nevertheless, to indicate that, in unretarded chancres before the Wassermann reaction is positive, the spirochætæ are enclosed in the circumscribed ulcer, practically cut off from the blood-supply and hence not reached by the action of the injections. To guard against this possibility, local treatment, excision of the chancre, and repetition of the injections are indicated. Thus, the specific spirillocide characteristic of neosalvarsan was verified clinically in a manner analogous to salvarsan. As regards the large number of cases, all that need be mentioned is that the symptoms promptly disappeared. Only in one case was the action somewhat retarded.

CASE I.—Patient had a retarded chancre; and immediately after the first injection a slightly elevated exanthem appeared on the abdomen and thighs. This yielded finally only after successive injections. In two pieces of excised tissue, spirochætæ were no longer evident after the first injection. Histologically, the tissue was typically syphilitic. After the fourth injection the patient was discharged. Shortly afterward he was found to be cured from a clinical standpoint, and gave only a weak positive Wassermann reaction.

In regard to tertiary symptoms, it may be emphasized here that sequestra are invariably an obstacle to the healing of tertiary syphilitic ulcers. In the very last series of patients treated with neosalvarsan, there occurred 2 cases of this sort, in which only after surgical removal of large pieces of bone was smooth healing of the ulcer obtained.

The few metasyphilitic affections which were treated with neosalvarsan showed the same improvement as when salvarsan was used. In cases of early tabes the results were excellent. In cerebrospinal syphilis, especially in the forms in which lumbar punctures yielded a positive Wassermann reaction, the outcome was gratifying; and a case of bullous stomatitis showed a decided improvement.

CASE II.—Patient, from whom syphilis could be completely excluded, and whose buccal and lingual mucous membranes were completely covered with extremely

painful vesicles filled with pus, so that eating and drinking had become almost impossible. A single injection of 0.3 grm. (intravenously) was given, and neosalvarsan was also prescribed as a mouth-wash in 1 per cent. solutions. The local application was very well borne, the solution was but slightly irritating, and after a few days the patient was discharged, cured. This case seemed to present a certain analogy to another treated in 1911 with salvarsan, which was in all probability a case of human foot-and-mouth disease. That patient had a large number of tense vesicles, filled with turbid fluid, on both hands and feet, as well as on the tongue and fauces. There was a slight elevation of temperature. We injected on two occasions small doses of salvarsan and saw a rapid retrogression of the symptoms. Hence, the conclusion is that in the present case the buccal lesions were influenced favorably by neosalvarsan.

In passing, it may be mentioned that in a whole series of cases, where in addition to lues, there was recent gonorrhea, the latter appeared to subside soon after the neosalvarsan treatment, although no local treatment whatever was instituted whilst the patients were in bed. The patients themselves, especially the women, declared, and, for the most part, voluntarily, that after the first injection the discharge diminished notably. To deduce any positive conclusions from these observations might be too presumptuous; and especially should the question be still undecided as to whether this favorable action was specific in character, or only the general tonic effect of the arsenic. Nevertheless, observations of this nature seem interesting enough to deserve mention.

In regard to the collateral phenomena which were observed in connection with neosalvarsan, it is beyond a doubt,—and this was the impression at an early period,—that the injections of neosalvarsan were incomparably better borne than was the corresponding dose of salvarsan. All the untoward symptoms which nearly every one, who has administered salvarsan, has seen despite the greatest caution and care,—the vasomotor disturbances and congestions during and directly after the injections, which often enough lead to collapse, the peculiar edematous swellings of the face, decided enough to discompose the physician, the gastric and intestinal disturbances, diarrhea, colic, etc.,—all these were either absent with neosalvarsan or, at most, present only in a notably small degree. Aside from a slight diarrhea and moderate vomiting in cases treated with the largest doses (1.2 to 1.5 grm.), the list of disagreeable complications is exhausted. There is no doubt that the neutral reaction of neosalvarsan is responsible for the absence of all disturbances. From experiments on animals it is known that many organisms react to intravenous injections of an alkali by vasomotor and violent gastro-intestinal disturbances; hence, the inference must be that all the untoward symptoms which follow the administration of salvarsan must be due to the excess of alkali, since owing to the chemical quality of salvarsan an exact neutralization is impossible.

Mention should be made here that the absolutely neutral reaction may also be responsible for the fact that neosalvarsan, even when injected subcutaneously in relatively large amounts, causes no infiltration worth mentioning. Formerly the infiltrations, in the vicinity of the needle puncture, were quite extensive and painful, as it was impossible to prevent some of the solution from escaping under the skin. But with neosalvarsan infiltrations are unknown. Further, the destruction of the veins injected has been much less frequently noted, which can be explained on the ground that there is no longer irritation of the intima from an alkaline solution.

BOOK REVIEWS.

CASE HISTORIES IN NEUROLOGY—A Selection of Histories Setting Forth the Diagnosis, Treatment and Post-Mortem Findings in Nervous Disease. By E. W. Taylor, A. M., M. D., Instructor in Neurology, Harvard Medical School; Assistant Physician, Department of Neurology, Massachusetts General Hospital; Visiting Neurologist, Long Island Hospital, Boston. Boston: W. M. Leonard. 1911.

The case system as applied to neurological teaching has received in this book of Taylor's a very permanent form. There is considerable doubt as to the value of case teaching, on account of the formal methods which necessarily must be used. The absence of actual cases renders the case system merely an adjuvant to clinical teaching, and with these limitations in view the book of Taylor's should be regarded. In spite of complete histories and the recital of carefully obtained data on the objective symptoms, the case itself remains shadowy and illusive. This is probably an inherent defect in every case method as applied to medicine. Notwithstanding these objections, there must be a certain value to the student in a method such as this, and one should find in this book the best illustration of the case system. One cannot help feeling, however, that there is a certain formality and stereotyped description which are, without doubt, necessary. There is likewise the tendency in the presentation of case histories of this nature to conform them more or less to the diagnosis in the writer's mind. The cases seem to fall more naturally within certain diagnostic limits than an actual case present. This is so notwithstanding the fact that the records contained here are those of an actual case. It seems, so to speak, as if the descriptive data were trimmed to illuminate and illustrate a certain diagnosis and are selected from the point of view of differential diagnostic problems, and not as cases that would come and go in a clinic. If one can compare the histories contained in this book with the histories of a careful neurological student and investigator, it will be felt that something very positive is lacking. Perhaps it is the personal touch of the examiner, his personal interest in cases of a certain kind, his personal prejudice, if you will, and the deduction from data less formally put than is here the case. Therefore, in reading these cases there is a certain lack of interest, a lack of aliveness, which renders the book most unsatisfactory from any point of view, except that of the student collecting details for diagnosis.

Notwithstanding these criticisms, which are probably a necessary part of the case-system method, this book can be earnestly recommended, chiefly as an illustration of the method of teaching which has obtained somewhat vogue, and as a collection of formal case histories, containing data more or less of value.

Nothing but praise can be felt for the make-up of the book, the good print and the nice arrangement.

The introduction of 22 pages on the general statement of diagnostic methods leaves, naturally, much to be desired, and one is in considerable doubt as to the amount of information the student would obtain from these pages. Just why they are supplied is difficult to say. Some of the illustrations are misleading, and are entirely too diagrammatic even for the student mind. It should be remembered that first impressions are lasting ones, and to make more simple than is actually the case changes found in the nervous system, upon which diseased types develop, is less of an advantage than would at first appear.

A COMPEND OF HUMAN PHYSIOLOGY. Especially Adapted for the Use of Medical Students. By Albert P. Brubaker, A. M., M. D., Author of "A Text-Book of Physiology;" Professor of Physiology and Medical Jurisprudence in the Jefferson Medical College, etc. etc. Thirteenth Edition. With 36 Illustrations. Philadelphia: P. Blakiston's Son and Co. 1912. Price, $1.25.

So long as hospitals and boards of health grade their applicants according to the grade received in a written or oral examination, books such as the above that serve to cram a student's head, there to remain for a brief period of time as a mass of unrelated facts, will meet a demand. They serve no other purpose.

EDITORIAL.

WHAT IS A QUACK?

A subject that has upset the medical profession for years too numerous to count is the all-absorbing one as to what constitutes a quack. Of course, as we all know, it is no difficult matter to bestow the opprobrious term on the man who holds no medical degree but whose audacity is of such gigantic measurements that he thinks his limited knowledge of medicine, culled from "popular" books on the subject, suffices to place him in the limelight of the public as the savior of mankind. But when the man has a medical degree from a "regular" school, has decent friends in the profession, and a social position of some consequence, but is given to short wanderings from the street called straight in that he has a hobby that clashes with accepted opinion, to call him a quack is another pair of sleeves, as our French confrères would say, and a pair, moreover, that is so friable that even a slight criticism might cause a rent that is intolerable. A case in point recently occurred in England where Dr. Robert Bell brought suit against Dr. E. F. Bashford and the *British Medical Journal* for defamation of character, on the ground that he had been called a quack for the reason that he had his own special theory in regard to the treatment of cancer. The jury found a verdict with £2,000 damages for Dr. Bell, since they did not think that the plaintiff had been "exploiting the timid and the credulous for his own advantage," to use the Lord Chief Justice's own words.

Now whether we agree or disagree with the English jury's verdict, the fact remains that we are still in Egyptian darkness as to when, where or how the term quack should be applied. Should it be limited to all men who have no medical degree, or should more laxity be practised

(of course, with caution) in case we wish to show our mean opinion of one in the medical profession who does not come up to our ideals? Or is it so uncertain a word, as regards its meaning, that a general taboo would be more effective? All Americans know, or should know, the many wrangles and the outpour of bitter controversy that have resulted from discussions on the true meaning of the word creole, and the futility of attempting a peaceful solution. And as regards the term quack, have not the minds of medical men been filled with all sorts of ideas, all sorts of interpretations, all sorts of applications? Two amongst us may agree, but could hundreds, not to mention thousands, have the same definition? And, this being the case, would it not be better to discard the word at once until such time when some agreement can be arrived at?

In a book which has recently come to our desk—"The Care of the Skin in Health"* by W. Allan Jamieson, no mean authority, by the way, we read: "There is perhaps no opinion in connection with sanitation more profoundly graven in the British mind, than the necessary association of soap with a bath. To suggest that for cleansing purposes soap can be dispensed with, is rank heresy. Yet in a multitude of instances the habitual use of soap for the ablution of the body and limbs, is certainly a mistake. It may be conceded that, during the day the hands cannot be kept presentable without soap, and there are undoubtedly occupations which render the skin of other parts so dirty, that these require its assistance for their purification. But at present we are speaking of the morning bath, not of the measures requisite to impart cleanliness to a skin soiled by employment."

Who would call Dr. Jamieson a quack for advancing a theory in connection with cleanliness that is diametrically opposite to what has been ingrained in us, not only by our mothers and nurses, but even by our family physicians? And yet he is wrapped up in a theory of his own, he is purblind to other theories, he makes his hobby a fetish; and, while he may not "exploit the timid and the credulous for his own advantage," he is just as guilty of throwing his javelin into accepted opinion as was Dr. Bell when he inveighed against operations for cancer. Of course, cancer is the scourge of the century, and if not treated as it should be results in death; and the bath, with or without soap, is a very simple matter by comparison, and can really be taken without the assistance of a medical man. But, all the same, a theory is a theory, and who can tell how many people, who hear of Dr. Jamieson's advocacy of "no soap" and follow his instructions to the letter,

*New York: Oxford University Press. 1912.

may not have certain skin diseases that will be unpleasant guests for their hosts.

If we mistake not it was Samuel Johnson who said: "Every man has a right to utter what he thinks truth, and every other man has a right to knock him down for it"; and, accepting this an an indisputable fact, neither Dr. Bell nor Dr. Jamieson should be surprised by what is thought of them. Now this does not mean that we are in favor of using the term which is the habit nowadays when describing medical men who have a hobby, but a declaration, on our part, that personal liberty is the greatest factor in human happiness, and that to be this factor both critic and criticized must have a right to it in equal proportions.

LORD ROSEBERY AND THE MEDICAL STUDENT.

In an address at the London Hospital Medical College on July 1st, on the occasion of the giving away of prizes to the successful students, Lord Rosebery said that he was convinced that those delightful creations of Dickens—Bob Sawyer and Ben Allen—were gross exaggerations, and, that on account of the legend that had gone forth in Victorian times, the public, sad to relate, was still under the impression that a medical student was a careless, rollicking individual whose indifference to refinement bordered closely on brutality. But he did not think that this sort of student ever existed in real life; and, while there may have been grounds in the past for some criticism, the present medical student can really hold his own in any company of cultured, refined gentlemen. These were not exactly Lord Rosebery's words, but even with the slight changes we have made his thought has been allowed to remain unimpaired. And much we marvel at it, for is not Lord Rosebery a statesman, a diplomat, a scholar of whom any country might well be proud, a man who has enjoyed the best fruits of education and whose mentality is built on the broadest lines possible? And does he not know, far better than any lesser man, that a medical student as he would wish him to be would soon deteriorate into a sorry prig whose attainments would be weak and whose ambitions would lie in the direction of making an impression by means of an uppishness that is fed by vanity and a make-believe of science? Better, indeed, the Bob Sawyers, the Ben Allens, the Jack Hopkinses of Dickens, with all their faults, than what might result from advice which would change the little daredeviltry that modern civilization has left to the medical student into a mincing, lackadaisical *poseur* who would prate about his achievements in language

that has all the deprecating pallor of an intelligence divorced from—we were about to write—Rabelaisian humor!

To what a low level this sort of student may sink, the sort who has made hilarity a crime, the joy of living an offence, the matter of birth or money an asset, has been brought home to us by Owen Johnson in his recently published book, "Stover at Yale." Here we see what money has effected in our own universities, how it has metamorphosed young men into mere manikins whose one desire is to be "better" than their neighbors: better as regards manner of living, clothes, amusements and other unimportant matters, with no deep thought of the stern realities of life, which can be successfully combated only by the broadly cultured. Yet, do we not daily prostrate ourselves before these products of our much-vaunted universities, just because convention has taught us that everyone who comes from these abodes of culture must necessarily be cast in a superior mold, when the truth is that their ignorances of those things that make for the best citizenship—knowledge of the classics, of modern literature, of languages and of the real spirit of the times— are so deplorable that one cannot easily reconcile oneself to the fact that even a third-rate university could turn out men who know more about clothes and automobiles and secret societies than about the English language.

Yes, Bob Sawyer owed his landlady, Mrs. Raddle, some months' rent; Bob Allen was uncultured enough to get into a controversy with her; Jack Hopkins told Mr. Pickwick some grewsome stories about the operations at Bartholomew's and about the child that had swallowed a whole necklace—"five-and-twenty beads in all"; but these three young men were at least human with that large sense of humor that will always count for much in a world where stupidity is much more prevalent than it ought to be. They were brusque, no doubt, but, even so, their brusqueness was not objectionable. How could it have been when they knew human nature so well that they realized they had a victim in hand when their caller was Mr. Pickwick, and Jack Hopkins indulged in the bit of "fooling" that makes a delightful page in Dickens. But, cultured in the modern university sense of the word, they were not, thank God.

THE PRODUCTION OF PNEUMONIA IN ANIMALS.

One of the greatest difficulties which has been encountered in the analysis of the nature of the pneumonic infection has been the inability to produce the disease in lower laboratory animals. The pneumococcus

septicemia which results from the injection of pneumococci in animals is a disease in no way resembling pneumonia in man, and naturally this condition has prevented the advance of knowledge of the most mysterious disease we know. Studies on the nature of the crisis might be expected to lead to a more definite understanding of the disease, but the limited possibilities of clinical research have been in the way of the probe for fundamental facts and conceptions. As long as pneumonia holds its present unenviable position in the morbidity and mortality rates, and as long as our store of knowledge remains so limited, we can well afford to take notice of any new element which offers promise of help in the solution of the problem. In these columns we have already called attention to several new incidents in the fascinating story, and we hope ultimately to be able to chronicle the last act—even though some of the scenes which looked bright under the limelight of the enthusiasm of the authors have dimmed into insignificance later. We might dwell for instance, on Rosenow's recent addition to his many-scened version, but we believe it better to await his finale before discussing it. But the note of Lamar and Meltzer must be recorded. They have found that by means of the intratracheal insufflation method of Meltzer and Auer they can inject pneumococci directly into the bronchus of dogs and thereby produce true lobar pneumonia. Many previous workers have tried many means of producing lobar pneumonia—with results, to say the least, inconstant. The present method is supported not only by definite and exact experimental data, but in a certain way fulfils the demands of clinical pneumonia. In man, pneumonia is supposed to arise from the lodging of the bacteria in a lung damaged by some force which lowers the resistance. Broadly interpreted this must mean an injury, not necessarily anatomical, but surely physiological. In the work on dogs the trauma is supplied by the tube carrying the organisms, by the fluid media lodging in and blocking some of the bronchi; thus the lowered resistance and the infecting agent are supplied at the same time. We refuse to predict what the results of study along these new lines may bring forth, but, as we have said before, we are most hopeful.

OPINION AND CRITICISM.

HOW TO KEEP COOL IN AUGUST.

Every year without fail, directly the hot weather sets in, some wight connected with a medical or lay journal sees fit to advise the public just what it should do to forget the circumambient atmosphere that is liable to play ducks and drakes with its nerves. This sort of advice is as regular as are those spring poems which are penned in winter and published in spring, just because editors think the psychological moment has arrived to entertain the public with what it might fail to note were it not for their perspicacity. What is not told us in the matter of keeping cool would barely fill a page, for these scavengers have hunted the field thoroughly, and have quarried every cooling drink, every cooling viand, every means of bringing fresh air into our homes, so that peace shall descend on us even if the thermometer is ambitious to reach the hundred mark. But exhaustion is theirs at times, just as it is ours after thoroughly sifting a subject; so when nothing else can be flung at us in their delightfully gratuitous way, and when they fear their ink is about to run dry, they summon up enough strength to write their most "fetching" piece of advice—go to the seashore, or if too poor for that, read our journal!

We take it that all doctors live in comfortable homes and have gardens fore and aft and cooling drinks, but we do not take it that the poor, or that large army of toilers who manage to subsist on a clerk's salary, have these conveniences. And these people really count for much in our cities, even though some of us in this democracy may think otherwise. They cannot go to the seashore or read the journals which the editors gleefully think will cool their blood, nor for that matter can they indulge in those luring drinks which are invariably mentioned in the published articles; they are not even of that class that can relax in outdoor places of amusement where the price of admission is low. But they could frequent parks in their immediate neighborhood, and there not only forget the tension of the day but for a few hours annihilate the thought of the two or three stuffy rooms in their tenement, which await them later in the evening with a temperature that has not been sweetened, what with washing, baking and cooking. Some American cities have parks or "squares," but even at best their number is infinitesimal. True, the larger parks are not wanting in every city, but with few exceptions they are so situated that access to them is impossible except by the well-to-do.

No doubt we have digressed from our subject, for the advice which has inundated us latterly as to how to keep cool in summer was unmistakably meant only for the affluent. But though the writers may feel that the people of large means need a timely warning far more than those of slender incomes, yet it cannot be gainsaid that counsel to be effective should have a more unlimited applicability. And since to follow the dicta laid down would take an outlay of money that is only within the reach of the minority, the makers of these mid-summer lucubrations should not feel disheartened that occasionally doubt is cast upon them as to whether they really are the right sort of guide to take the people into the Promised Land that wots not of heat.

LITERARY NOTES.

Dr. Woods Hutchinson is an unusual writer for a medical man, for his point of view is not only surprisingly original but it is thoroughly unaffected by those teachings, now found in standard medical works, now in the more serious books which belong altogether to that vast literature of modern times—social science. That he is cock-sure when he makes a statement is not his least charm, though this opinion may be disputed in certain quarters where uncertainty is a virtue of far greater magnitude than an unswerving aim that goes straight to the point. But to the thinking of the present reviewer, even if a home thrust is tinged, as it necessarily must be, with considerable audacity that takes small account of judgment, it has this enviable quality that we know positively the author's point of view, and know it to be his and no one else's. Both in "Exercise and Health" (Outing Publishing Company, New York) and "We and our Children" (Doubleday, Page and Company, New York) is to be found what has just been dilated on, and were it otherwise both these books would at once descend to the level that makes for commonplaceness. Dr. Hutchinson not only knows his subject but knows just what should be said on it to bring out both its good points and bad points in strong relief; and though the serious-minded reader may differ with him and hold him frivolous where he should be serious and throw his books aside in disgust, he will, if he is unprejudiced, think better of his rash act, take them up again and read them with renewed interest. No greater compliment than this could be paid an author, for it shows that his point of view is so daring, so out of the ordinary, that the reader, accustomed to a more agreeable diet, must get used to it to appreciate its many good points. Every medical man, who has read the balderdash on health and exercise written by medical and lay men, and has thought that his readings were profitable, should at once take up "Exercise and Health," and not peruse

it lightly but read into the sane thought of the author. And the same advice applies to the other book, "We and our Children," since here even more than in the first mentioned there are a number of subjects that are treated so characteristically by the author that a new phase is given them. Originality when coupled with sanity is not such an everyday quality that it may be lightly passed over; and, since this is the firm conviction of the reviewer, he feels that the best that can be said of an author is that he is fortunate enough to belong to that small coterie of writers whose words give pause far greater, just because they have something new to tell us.

In "The Story of a Doctor's Telephone" by Ellen M. Firebaugh (The Roxburgh Publishing Company, Boston) the reader will learn the many hardships a doctor's wife must undergo if she would be a faithful helpmeet to her husband in the matter of receiving telephone messages correctly and recording them so that no mistakes can arise. This task is not the easiest in the world, but that the length of each message is the sort recorded in this book is indicative of only one thing—a strange garrulousness on the part of each patient. That patients are talkative even over the telephone is known to many of us, but the instances, though somewhat maddening, are few and far between enough to make us hopeful that the recurrence is not a thing to be dreaded. After reading this book, the male reader, if he is a member of the medical profession and still unmarried, will marvel at the possibility of any woman wanting to be his wife, while the female reader, if deeply impressed, will look askance at any medical swain who has the temerity to ask her hand in marriage. Of course, there are all sorts of people and conditions in this world, but any wife who is as busy receiving messages at the telephone, as is the doctor's wife in this novel, deserves a triple crown, provided the weight of it is not so great that her jangled nerves will cry out against an additional burden to those she already carries in connection with her sentinel duty at the telephone.

Mr. Abraham Flexner's latest Odyssey is entitled "Medical Education in Europe," and what he tells us, while known to some for many years, will be unwelcome news to those Americans who imagine their medical schools are without equal. That we have been lax in our manner of conducting medical schools is brought home to us in the chapters of this book in no mistakable way, and what with a style of writing that is effective, Mr. Flexner's performance must give us pause. While we do not wish to belittle his admiration of England, France and especially Germany, we nevertheless feel that the methods pursued in

those countries would hardly apply to the United States. Every country must evolve its own system, and though we have but small praise for what is done to-day in most of our cities, in the matter of conducting medical schools, to import the methods of Germany—and these are mentioned because Mr. Flexner seems to have a predilection for them—would be a huge mistake. In short, our Americanism must produce something better than it has done in the past, and that it can do so without the German methods goes without saying. But to do this the commercialization of the medical college must cease, and an era be introduced that will look to science and small gains as a reward. Of course, for this golden period other methods than those in vogue to-day must obtain, but can it be gainsaid that if the thing is done in our American way it cannot be successful? England to-day, and for that matter for many years, has conducted all her schools on lines that are distinctively English, and so has France in her French way and Germany in her German way. Now it is easy enough to understand that this country must evolve a system of her own, and what that shall be the present, with all its educational resources, should know. Mr. Flexner's book is timely and of an interest whose import cannot be denied; but, though we may read it for months and even for years, to assert that out of it will come a solution of the dire medical school situation in this country, as illustrated at the present time, is overstating facts.

One does not read John Masefield's "The Everlasting Mercy" and "The Widow in the Bye Street" (The Macmillan Company, New York) for the prettiness of the story, for the description of character that will fit in with our own superficial observations of humdrum folk, but one does read the book, and with increasing interest, if the desire is to get in touch with a master-hand that can tell the story of people's lives, not as it is related in drawing-rooms or clubs, but as it is told by real men, alas only too rarely, when they are not afraid of criticism on account of an unwonted boldness. Masefield represents what is best in modernity—honesty, clean-cut directness, and above all truth. Now this is an important matter to remember in his case, since he does not bother about the "ias" and "isms" which most modern writers imagine are the best evidence that they have been bitten with modernity, and hence have a mission to perform, so that another chapter in mental pathology can be opened; for his modernity plays around something that is much more appealing to the healthy mind—men and women dowered more or less by Nature, whose course of life runs rough, because the natural life of man is rugged and devious and open to the world. And just because Masefield represents the opposite of what medical men steep their minds in from early morning until late at night, whether at

the bedside of patients or in the quiet of their study, we would recommend, to get back their normal mental status, a thorough reading of this book; for though pathology may mean much to the physician, the realities which are around us also have their import and should not be swamped in anybody's mind by too long or too unintermitted a course in one's studies, or, on the other hand, by the bread-and-butter novels which the busy physician instinctively turns to when he wishes to drive all thought of disease out of his overwearied brain.

The child of to-day really deserves our deepest commiseration, for is he not the target of a sexual education such as has never been visited on any human being before? Who has not expressed surprise at the constant flow of books from the publisher to the editor's desk, or the bookshop, on "what a boy should know," "what to say to the boy," "how shall we train the young," "what should a girl know" and so forth, and marveled that certain human minds should be so constituted that they feel theirs is the mission to rectify a wicked childhood. Verily, the child of to-day is to be pitied, for surely the time is not distant when some ambitious mother will make a cult of all these silly books, partially digest them, and then visit her theories on her unoffending child. But all books on the sex question as it pertains to childhood are not of this calibre, which is really very fortunate for the reader as well as the child, since enlightenment of the right sort is what the former wants and advice of the right sort is what the latter should receive. In no book on the sex question which has come to our desk of late has this subejct received saner treatment than in Dr. Albert Moll's "The Sexual Life of the Child" (George Allen and Company, London), nor has any other author interpreted the awakening of the sexual life of the child with the same degree of insight and intelligence. The psyche of the child is unfolded, in all its phases, with a scientific precision that too often fails in its object in a number of books of the better sort on the subject of sexual education, because the author's attitude is completely divorced from sympathy. But no such charge can be brought against Dr. Moll, for not only has he peered into the mind of the child so as to get at its psychology, but he sees a way out of all the entanglement, that superficial writers have thrown around the question of sex instruction, in so engaging and heartening a manner, that the reader must thank him sincerely for piercing the usual gloom with a gleam of light that cannot but be the beacon for all those who wish to learn something momentous about the sexual life of the child.

ORIGINAL ARTICLES.

PRECAUTIONS IN THE USE OF TUBERCULIN IN THERAPY.

By F. Morris Class, M. D., of New York,

Instructor in Applied Therapeutics, College of Physicians and Surgeons,
Columbia University, New York; Attending Physician (Department
of Tuberculosis) and Attending Physician to the Day Camp
for Consumptives of the Vanderbilt Clinic, New York.

In Sahli's "Tuberculin Treatment"* is the following succinct statement: "Tuberculin treatment is not an active immunization pushed to its furthest limits, but rather that the essence of the treatment is to stimulate the natural factors, and to promote the cure by means of the natural functions of the body."

After such a flood of literature, sounding many depths, from hysterical praise to equally obnoxious and wholly untenable derision, it requires no small delicacy of intuition for the general practitioner, or indeed the rank and file of specialists, to separate the grain from the chaff, or to disentangle sound warning from blind aversion. After all is said and done, leaving due margin for injudicious dosage, inexperience and the ever-baffling personal equation, there is coming to light rather rapidly an excellent working basis in tuberculin usage, with every assurance of reasonable success in a goodly number of cases, for those who will but acknowledge promptly and continuously the limitations of the method, and the dangers attending its abuse.

Whereas in the origins of diphtheria antitoxin, therapeutically speaking, the pitfall was proved to be too small and too infrequent dosage, the tuberculin enthusiast, from von Leyden down, quite overshot the mark and is still so doing in a very appreciable number of cases. One practically never sees a case when too little tuberculin seems to be the fault; while excessive dosage, with results ranging from unfortunate to desperate, greets one too often in the literature and in practice.

Having accepted then, that small, cautious dosage is the ideal and the only method to pursue, the cases group themselves quite readily under three headings. Group I.—Those who take the treatment well, who show no local or focal reactions, and whose improvement, clinically, is most obvious. Group II.—Those who take tuberculin indifferently well,

---

*Translated from the 3rd German Edition by W. B. Christopherson. New York: Wm. Wood and Company.

sometimes reacting and sometimes not, and whose improvement is irregularly and fitfully manifest. This is a large and important group which it will pay us to discuss later on. Group III.—Those who react repeatedly even to the minutest doses; who never gain clinically under its influence; and who show from the start their complete inability to handle the treatment. They should not be given tuberculin in any form or in any dosage, and should be recognized and acknowledged promptly. At a glance this grouping would seem to demand careful selection in the cases to be treated, and effectually shut out from the start a large percentage,— none of Group III, and those of Group II who do not respond promptly to the treatment. As a matter of fact, in the writer's experience, based on a continuously active list of 200 cases, less than 1 per cent. are on the tuberculin treatment, and of these some present lesions only in the eyes, bones or tissues other than pulmonary. Only by such careful selection does one get a relatively high percentage of cures.

The clinical picture, or the amount of tissue involved seems to offer no cue as to whether tuberculin will be well borne or not; and the experience, accrued from no matter how many former patients, will tell the physician nothing of value regarding a new patient. Each is a law unto himself, and each responds with an index quite individualistic, and without any obvious relationship to any group of similar cases. Again, one is impressed repeatedly with the marked change for the better to all outward appearances in some cases (gain in weight, lowered pulse, temperature, and generally improved tone) while the local tissue, especially in pulmonary involvement, does not seem to have been affected a whit, one way or the other. These cases ultimately do well, with large areas of repaired tissue and arrested processes, if the treatment be continued always warily, guarding against latent or unusual signs of reaction. These latent or unusual signs of reaction are manifold and tricky. Until the entire subject of tuberculin therapy is older and still more clarified, it is far wiser to assume the tuberculin to be responsible for any deviation from the normal daily path of well-being. This includes headache, slight or transient loss of appetite, sudden loss of weight (even less than a pound), sudden rise of pulse or of fever; and, in the presence of this change from the normal routine, all tuberculin must be stopped until the normal condition of the patient has returned. This rule is inexorable. It is necessary also to cease treatment during any intercurrent factor such as diarrhea, menstruation, abscess of a tooth, acute coryza, indigestion, pleuritis or, of course, during any exacerbation of the disease itself.

Latent reactions are occasionally so slight as to be confined to a mild, transient leucocytosis, and nothing more. This has been clearly demonstrated in a recent report:* "There may occur a rise in temperature without an increase in the number of leucocytes, and, vice versa, an increase

---

*Miller, Lupton and Brown (*Amer. Journ. Med. Sciences.* Vol. CXLIII, No. 5, pp. 688-689).

in the number of leucocytes, without a rise in temperature." The kind of tuberculin used, whether O. T. or B. E. did not make any discernable differences in their behavior.

In order to determine, therefore, whether a patient is reacting or not, the first and absolute essential is a complete and constant series of clinical observations. Patients should be taught to take their own temperatures and to record the results faithfully. This record should be handed to the physician at each visit. Temperatures are best taken at 8 a. m. and at noon; again at 4 and 8 p. m. Nothing should be allowed to interfere with this routine, even business men should consider the time necessary for the recording as of the utmost importance.

In this way late or unusual rises in temperature may be noted. They may be less than a degree, or less than 99° F., yet if they appear after an injection and not in any other part of the record, they are to be interpreted as slight reactions and treated accordingly. Probably two treatments a week with the smallest doses (the ten-thousandths of a milligram series) are quite enough, and only one a week as the dosage increases.

In case of a reaction, tuberculin should be withheld at least a week, or until every possible sign of it has disappeared after careful and varied examination; and on renewing treatment the dosage must be cut down considerably. Thus if a patient reacts to 7/1,000 mg., the next succeeding dose should be only 4/1,000 or 5/1,000 mg.

This brings us back again to a moment's discussion of the cases outlined in Group II—those who take tuberculin but indifferently well. The writer is firmly convinced that, in the long run, their recovery is retarded, if not jeopardized by insisting on pursuing the treatment in the face of repeated reaction. Some months ago, there was such a case in the writer's care, who showed perfectly the poor results of repeated reaction. He was a second stage case (turban), with a temperature from 99 to 100° F. when first seen, and a pulse of from 100 to 112. Prolonged rest in bed worked wonders. In three months his weight rose from 118 to 130 lb. and his temperature remained normal for weeks, even when allowed to dress and walk about the city. At this afebrile stage he was started on O. T., 1/10,000 mg., given twice a week. Everything went well; there was no sign of a reaction. He was allowed to return to business. His weight increased to 146 lb. When the dose reached the amount of 4/1,000 mg. his pulse rose sharply, he had fever (up to 100° F.), malaise, headache and constipation. This persisted for two days, and after a week's rest the treatment was renewed, starting with 1/1,000 mg. He did very well as before until the same maximum of 4/1,000 mg. was reached, when he reacted promptly but more severely, and was a week regaining his normal mean. After a fortnight's interim the same procedure was started again with a precisely similar result for the third time. This time, in addition to his other symptoms, he lost 5 lb. and for

nearly a month lost a little weight constantly, so that he dropped from 146 to 136 lb. without showing any other evidence of a continued reaction. He was allowed a month's rest and was put back on tuberculin, but in doses of 10,000 mg., and no attempt will be made in future to approach the danger-zone in which he has reacted repeatedly so sharply.

One must not lose sight of the fact that patients at rest, or living quiet sanatorium existences, will take tuberculin more readily, as a general thing, than those in active business. The latter, of course, by their daily efforts, are handling a good deal of autogenous tuberculin which must be reckoned with, and the physician's dose correspondingly diminished.

Again caution should be urged whenever a dose of tuberculin is given from a new bottle, even though it was purchased from the same firm and kept under precisely similar conditions. It is necessary always to begin with a smaller initial dose than the last previous one given from the old bottle or test-tube.

Finally, the question presents, Should a patient doing otherwise splendidly, gaining, let us say, from 1½ to 2 lb. a week, be given tuberculin at all? Probably they should, if they take it readily. Not always do patients who gain rapidly show the ability to hold their own, or to keep permanently an apparently arrested condition. Tuberculin will aid in establishing an immunity which will prove more genuinely stable than in those who have relied on hygienic means alone.

Caution then is the byword; better never enough than one overdose. Only those physicians will get intelligent, gratifying results who are content to work on small canvasses, and who are able to proceed with the full confidence of their patients, in a course of therapy from which they are destined, peculiarly, never to see an immediate evidence; the final outcome being happiest in those whose quiet progress has been most uneventful.

24 West 45th Street.

WHEN AND HOW TO USE DIGITALIS.

By ALBERT E. TAUSSIG, M. D., of St. Louis,
Associate in Medicine, Washington University.

In the treatment of heart disease, the interest centres in the therapeutics of broken compensation. Valvular lesions as such rarely require treatment. It is the incompetent heart muscle that demands our care, and the treatment of this condition is, to a large extent, independent of the nature of the lesion responsible for the broken compensation. Of all the drugs at our disposal, in the treatment of heart-failure, none compares in value with digitalis and its allies. It has become so indispensible, in daily practice, that Naunyn said of it: "Without digitalis, I should not wish to be a physician."

The early history of the drug is not without interest. In 1775, William Withering, a Birmingham physician, learnt that an old woman of the neighborhood had acquired a great reputation for the cure of dropsy by means of a secret concoction composed of some twenty herbs, of which, after some study, he concluded that the fox-glove was the essential one. It was not until after he had used it in his practice for ten years, that he published his results. Withering continued to lay chief stress upon the diuretic effect of digitalis, though he also recognized its effect upon the heart.

How DIGITALIS ACTS.

The action of digitalis has been very carefully studied experimentally, though there are still some points about its action that are obscure. It affects the heart chiefly by stimulating the vagus centre. Stimulation of the vagus nerve, as is well known, affects the heart in a number of ways. It slows the rate of contraction of the auricles and therefore also of the ventricles; it diminishes the force of the cardiac contraction, lowers the tone of the heart muscle, and depresses its conductivity. On the other hand, acting directly upon the heart muscle itself, digitalis increases both its tone and the strength of its contraction. These two modes of action thus neutralize each other to a certain extent, leaving as the main resultants of digitalis-action a slowing of the heart-rate, primarily by its effect upon the auricles, and an impairment of conductivity.

This last, perhaps, deserves some explanation. Beginning at the point at which the venæ cavæ empty into the right auricle, there runs down through the heart a sheaf of pale, gelatinous fibres known as the bundle of His. It passes down in the wall between the two auricles to the mus-

cular septum which, dividing, it straddles and sends numberless branches throughout the muscular tissue of the ventricles. Each impulse, that normally makes the heart contract, originates at the beginning of this bundle, passes down into the auricles causing them to contract, and then into the ventricles, stimulating them in turn. It requires an appreciable interval of time, normally one-fifth of a second, for the impulse to pass down from auricles to ventricles; and this is the reason the former contract before the latter. Stimulation of the vagus, either mechanically or by means of digitalis, tends to lower the conductivity of this bundle and thus to interfere with the response of the ventricles to auricular systole. Ordinarily this action of digitalis is not of great importance, but in certain conditions, as we shall see, it occupies the foreground of the picture.

Valvular Lesions.

A valvular lesion of the heart, in itself, requires no treatment. This statement, perhaps, calls for some modification. If the etiological factor is syphilis, Oigaard has shown that specific treatment often produces surprisingly good results; and acute endocarditis, whatever be its cause, of course, requires most careful attention. But once the valvular lesion has become established, no special treatment is required so long as the heart muscle is competent. The patient must merely be made to realize that he is more or less of a cripple, and that he must not call upon his heart for more than it is able to perform. At the best, however, a defective valve imposes upon the heart muscle an abnormal amount of labor. This slowly produces a degeneration of some of the muscle fibres, and sooner or later the impaired myocardium finds itself unable to respond to the extraordinary demands made upon it. The heart dilates, endeavors to make up for the feebleness of its contractions by means of an increased rate of beating, and the well known symptom-complex of heart failure results. Our mode of treatment then must be twofold. First, we must, so far as possible, lighten the task imposed upon the weakened heart, and, secondly, we must endeavor to strengthen the muscle itself. The former is best accomplished by absolute rest in bed, by a bland diet and, if there is dropsy, by a restriction of the liquids consumed, by tapping, etc. If there is much engorgement of the right heart, venesection may be a life-saving measure. For the purpose of strengthening the heart muscle, a number of procedures may be mentioned: the precordial ice-bag, carbonated baths which are occasionally serviceable, and a long list of heart tonics. None of these, however, compares in value with digitalis. This acts, in such cases, chiefly by improving the nutrition of the heart. By its action upon the vagus centre it slows the rhythm of auricular contraction and therefore also of that of the ventricles. The result is that the heart muscle has more time to rest between each systole, and that its supply of blood through the coronary circulation, which takes place only during

diastole, becomes more adequate. The exhausted muscle-fibres slowly acquire renewed vitality, and a more or less complete compensatory hypertrophy may ensue. The directly stimulating effect of digitalis upon the heart muscle and upon the tone of the peripheral vessels doubtless plays a part, but probably a minor one. In spite of the statements of the older textbooks to the contrary, this beneficial effect of digitalis may be expected in myocardial incompetence due to a valvular lesion, no matter what the nature of the latter. The danger, for instance, of giving digitalis in aortic regurgitation is entirely illusory. Sometimes, as in certain aortic lesions or in arteriocapillary sclerosis, it may be well to combine it with nitroglycerine or some other vasodilator, but even this precaution is usually unnecessary. The main point is to give it in sufficient doses until the desired effect has been produced and then to discontinue it. The usual mistake is to give it in too small a dose. Not long ago, the writer saw in consultation, a boy with badly broken compensation following a mitral leak. He sat up gasping for breath, with pulmonary edema, a big liver, albuminuria and swollen legs. The statement was made that digitalis had proved ineffective, though he had received ten drops of the tincture three times daily. The daily dose of digitalis was increased threefold, a few doses of theocin were given, and the result was all that could have been desired. Two months later he was playing about in the yard. The result in such cases will, of course, depend on the degree of myocardial degeneration. Dead or moribund muscle-fibres cannot be recalled to life no matter how much their nutrition is improved or the strain upon them lessened. This is why successive attacks of heart-failure show a steadily lessening response to digitalis. This observation was formerly erroneously interpreted as indicating that the heart gradually becomes habituated to digitalis, giving rise to the false doctrine that the drug should not be given in mild cases of myocardial incompetence, but should be held in reserve as a last resort.

MYOCARDITIS.

In primary chronic myocarditis, so-called, the picture is somewhat different, chiefly because here we have usually a higher degree of myocardial impairment. A defective myocardium that is still able to maintain the circulation with intact valves might be utterly incompetent if further handicapped by a valvular lesion. The earliest phenomenon, in such a myocarditis, is the occurrence of extra-systoles. These are among the most interesting phenomena of heart disease. They are due to a heightened irritability of the myocardium leading the latter to respond to stimuli smaller than those required normally. Etiologically, they may be of two sorts, neurogenic and myogenic. The former are found in certain nervous individuals, and require no treatment other than a regulation of the mode of life and perhaps the restriction of tobacco, coffee and the

like. They in no way tend to shorten life or to impair the patient's ability to labor. The other kind indicates a beginning myocardial degeneration and calls for a suitable restriction of the patient's activity, the removal of possible toxic agents and the like. Digitalis is not required, and indeed may do harm since the drug itself tends to produce extrasystoles, probably by its direct action upon the myocardium (Cushny). Wenckebach, to be sure, urges its administration in small doses wherever there are extra-systoles, but nearly all the other authorities in this field disagree with him. If the heart has become incompetent, as shown by tachycardia, dilatation, dyspnea and the signs of passive congestion, digitalis is indicated, whether extra-systoles are present or not.

Fig. 1. (After Mackenzie.)—Chart comparing the effect of digitalis in cases of mitral stenosis having auricular fibrillation with those having a normal rhythm. The black dots represent the rate with auricular fibrillation and the white with normal rhythm, both groups of cases having the same valvular lesion. The side figures represent pulse-beats; the top figures represent days of digitalis administration.

AURICULAR FIBRILLATION.

Another most interesting type of cardiac irregularity occurs in somewhat more advanced cases of myocarditis, and was formerly known as arrhythmia perpetua. This is the common form of cardiac irregularity found in the hearts of elderly people. Lewis has shown that in this condition we have a fibrillation of the auricles. The auricles, instead of contracting rhythmically, are in a state of fine and rapid tremor. This amounts to a state of complete paralysis so far as the ability of the auricles to fill the ventricles is concerned. Not so as regards their effect upon ventricular contraction. A shower of rapid and irregular impulses passes from the trembling auricles down the bundle of His, into the ventricles, stimulating the latter to rapid and irregular contractions. The

result is a rapid and extremely irregular pulse, which readily causes an inefficient circulation, both because the ventricles have not time to fill adequately, and because the rapidity of the contractions impairs their nutrition and tends to exhaust them. A variety of factors may produce a temporary auricular fibrillation, and interesting cases of this sort have been reported (Hewlett, Mackenzie), but in the great majority of cases, this condition, once established, is permanent. It is obviously a most serious lesion and the ultimate prognosis is bad. Fortunately, however, it is in just these cases that digitalis is most triumphantly successful, at least for a time. And its mode of action here is peculiarly interesting. In ordinary myocarditis and in hearts rendered incompetent by the burden of a valvular lesion, digitalis slows the heart by stimulating the vagus, thereby causing the latter to lessen the frequency of auricular contraction.
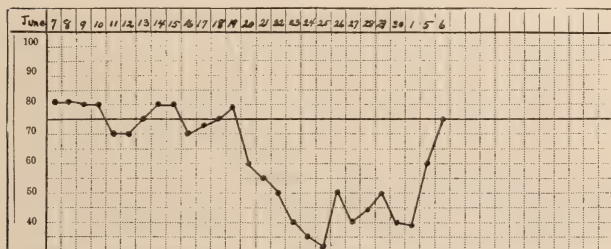
Fig. 2.—Showing the effect of even a brief period of digitalis medication upon the pulse-rate in partial heart-block. The digitalis was given from June 18th to June 23rd, inclusive. Note the drop in the pulse-rate even after the discontinuance of the digitalis and the slow recovery.

In auricular fibrillation, however, the auricles are thrown out of commission, and the mode of action of the drug is radically different. It here acts by impairing the conductivity of the bundle of His. If digitalis is given in sufficiently large doses, and very large doses are required, the bundle becomes less and less able to transmit impulses from auricles to ventricles, and the latter, instead of responding to each considerable tremor of the former, contract only after the strongest ones. The result is a very marked slowing of the ventricular rate of contraction, much greater than in other cases of broken compensation, with all of the accompanying benefits to myocardium and circulation. If the digitalis be pushed unduly, a complete block of the bundle of His may result. The heart then beats very slowly, 30 to 40 times per minute, and entirely regularly with the exception perhaps of an occasional extra-systole. This complete heart-block is usually only temporary, ceasing as soon as the digitalis is discontinued. Still, it is an

undesirable complication. It is better to reduce the dose of the drug when the pulse-rate has fallen to about 80, trying so far as possible to maintain it at about that rate. Such patients need to be kept constantly on larger or smaller doses of digitalis, and, if carefully watched, often do surprisingly well for long periods of time.

HEART-BLOCK.

In this connection it may perhaps be well to say a few words about a somewhat similar condition in which the main lesion is situated in the bundle of His itself. If the bundle of His be diseased and its conductivity therefore impaired, though auricles and ventricles be otherwise fairly normal, it no longer transmits the impulses from auricles to ventricles as readily as it should. The first result is a lengthening of the interval between auricular and ventricular contraction, a condition that may be readily detected by means of the cardiosphygmograph. As the lesion progresses, an occasional auricular impulse may fail to get through and the ventricles will miss a beat. The result is an irregular pulse that, unless it is carefully studied, may readily be mistaken for some other form of myocardial irregularity. If digitalis be given in such cases it will still further reduce the conductivity of the already impaired bundle and may do very great mischief. This is well illustrated by the following case:—

The patient was a teamster, æt. forty-eight, who since the summer of 1909 had steadily grown more dyspneic. When the writer first saw him in June, 1910, he was confined to bed, very short-winded. Physical examination showed a dilated heart, a mitral leak, evidence of atheroma of the aortic valves, pulmonary edema, an engorged liver and great anasarca of the legs. The radial pulse was 82 per minute, every fourth or fifth beat dropping out. The sphygmogram showed a condition of partial heart-block. The myocardial incompetence was so marked that digitalis seemed to the writer to be indicated in spite of the evidence of impaired conductivity; mistakenly, as soon appeared. He was given 15 m. of the tincture three times daily. On the third day, the pulse which had been 80, dropped to 60, and then lower and lower until, in spite of the discontinuance of the digitalis, it reached 32 beats per minute. The diagram of the pulse-rate (Fig. 2) shows that the digitalis effect was not produced until after the drug had been given forty-eight hours, but persisted for a week or more after its discontinuance. The sphygmogram usually showed complete dissociation of auricular and ventricular contractions, though occasionally every second auricular beat went through. The patient's condition meanwhile had grown subjectively much worse. On June 22nd, he had a brief attack of faintness, suggesting a Stokes-Adams attack. He was taken off digitalis and put on theocin 5 gr. t. i. d. A great polyuria set in, he grew rapidly better, the heart-block again became partial, as shown by the sphygmogram, and the pulse-rate rose to between 65 and 80.

The situation is very different if the disease has gone so far as to cause the establishment of complete heart-block. In this case auricles and ventricles beat regularly but quite independently of each other, the former nearly always much more rapidly than the latter. The block being

complete, digitalis can no longer exert a deleterious action upon the conductivity of the bundle. The contrary is rather the case. Erlanger and Hirschfelder have shown that a block, which is complete when the auricles are beating rapidly, becomes less so if the auricles are slowed. If in such a case, we give large doses of digitalis, the auricles beat more slowly, the block becomes less complete, and the ventricles may beat more rapidly if somewhat irregularly. We thus have the paradox that, whereas in all other conditions digitalis acts advantageously by slowing the heart, in these cases of extreme bradycardia it benefits the circulation by making the pulse somewhat more rapid; and that, whereas in partial heart-block digitalis is absolutely contraindicated, in complete heart-block it may act advantageously.

FEVERS AND SHOCK.

When we are called to a case of some infectious disease and find the patient with a rapid, thready pulse, our first impulse is to give digitalis. We have seen similar pulses, due to heart disease, respond so well to the drug that we feel it must be of service here also. But our hopes are vain; the digitalis does no good. The reason is, apparently, that in such cases the heart behaves badly, not because it itself is diseased, but because it is continuously depressed by the toxins circulating in the blood. A therapy directed towards the neutralization or elimination of the toxin may be of avail; cardiac stimulation, even by means of digitalis, is without effect. Indeed, digitalis may do positive harm by whipping up the already exhausted heart and through the gastro-intestinal disturbance it may induce. A single exception to this rule is found in pneumonia. Here the heart often responds beautifully to digitalis, and indeed it may be well to give it, in moderate doses, from the beginning of the illness. The explanation of this phenomenon probably is that, in pneumonia, the heart failure may be due not so much to the toxemia as to the obstruction to the lesser circulation induced by the massive consolidation of the lung. We thus have a relatively unimpaired heart, struggling under an unusual load, and we may rationally expect it to respond to stimulation. When the heart-failure is due to toxemia, digitalis is quite as ineffective in pneumonia as in other infections. This explains what we have all seen—that in some cases of pneumonia the heart responds readily to digitalis, in others not at all.

In surgical and other shock, too, digitalis is relatively impotent. Whether it is true that shock is an expression of vasomotor paralysis or not, the fact remains that other agents, hypodermoclysis, adrenalin or even strychnine, are of more avail than digitalis. The writer has given digitalis a great many times in this condition intravenously and otherwise, and has never been able to satisfy himself that it had any effect. Strophanthin, intravenously, sometimes acts a little better, but not much. Other procedures are far more effective.

Choice of Preparation.

In determining which preparation of digitalis we are going to use, we have a long list from which we may make our choice. Several of the preparations offer special advantages. At its best, the powdered leaf is excelled by none. It gives us most completely the full digitalis action. The old Niemeyer pill, consisting of digitalis, squill and some form of mercury, is a good preparation and often produces excellent results. Its disadvantages are that the squill is apt to produce gastro-intestinal irritation, and, unless carefully watched, the mercury may cause salivation. The writer has recently seen a rather bad case of the latter following the use of Niemeyer pills. Standardized digitalis leaves are now obtainable and, if carefully kept by the pharmacist, retain their activity for a long period of time. If allowed to become moist, they deteriorate rather rapidly, and, in general, unless one has personal knowledge of the activity of the pharmacist's supply, it is safer to prescribe some other preparation. The infusion possesses no advantages over the powdered leaf and all of its disadvantages, and, unless carefully prepared, may be nearly inert.

An excellent preparation, and the one usually prescribed by the writer, is the tincture. As prepared by a number of good pharmaceutical houses it is constant in its activity and is easily dispensed, besides being cheap. In prescribing it, it is necessary to remember that it takes two drops of the tincture to make one minim.

Perhaps the very best preparation of digitalis is Knoll's digipuratum. In it the various inert elements of the leaf, as well as the irritating digitonin, are removed, and a stable, comparatively unirritating compound of a definitely determined activity results. It has the disadvantage of being rather expensive; but, where the element of cost does not enter, it should certainly be the preparation of choice.

The alkaloids, among which the best are the French crystallized digitalin and the German digitalinum verum, offer no special advantages, at least when given by mouth. The dose varies with the preparation, that of the German digitalin being several times as great as that of the French. If we require a more rapid effect than the oral administration of digitalis admits, Cloetta's digalen may be injected intravenously. Hatcher has, however, recently pointed out that the claims made for digalen are grossly exaggerted. When a rapid digitalis action is needed it is better to use strophanthin. This may be obtained ready for use in ampoules, and, if injected intravenously, gives us the most powerful and most rapid digitalis effect at our disposal. In cases of severe heart-failure, it is often advisable to begin with a single intravenous strophanthin injection and to continue the treatment by means of the oral administration of digitalis. Neither strophanthin nor any strophanthus preparation should be given by the mouth, since we can never tell how much of it will be destroyed in the digestive tract.

Dosage.

In cases of broken compensation, the best results are obtained if the drug is given in massive doses and the patient carefully watched. A dram of the tincture daily, or corresponding amounts of the other preparations, is a moderate dose. This daily quantity should be given in divided doses; but it is a matter of indifference whether 15 m. are given four times or 5 m. twelve times daily. In about two days, the maximum therapeutic effect will usually have been produced. This will be shown by a slowing of the pulse, an improvement of the general condition, and more or less gastro-intestinal disturbance. The dose may then be cut in half, and this smaller dose given for a considerable period of time. If the pulse becomes irregular, on account of the production of extra-systoles, too much digitalis has probably been given, though no harm has usually been done. In this case, the drug should be discontinued for a time. Signs of heart-block will not occur if the patient has been carefully watched; if they do, digitalis must, of course, be stopped. The largest doses are indicated and are well borne in cases of auricular fibrillation, especially if the ventricular myocardium is relatively intact. In these cases, 15 m. (equal to about 30 drops) may be given every four hours for several days. The pulse then changes from a very rapid and very irregular one to a more nearly regular one with a rate of 70 to 80 per minute. The dose may then be reduced to one that maintains this condition, say 15 m. three times daily, though this will vary with the individual case.

A number of writers, among them Wenckebach and Schmoll, have recently advocated the use of digitalis in so-called tonic doses. After the severe symptoms of heart-failure have been overcome by the use of sufficiently large doses of digitalis, the heart may often be kept in good condition by the administration of small doses of the drug, continuously, for months or even years. In such cases, a grain and a half of the powdered leaves or 20 to 25 m. of the tincture may be given daily without any untoward effects. The writer has used this method in a number of cases with very satisfactory results especially in auricular fibrillation.

Contraindications.

The contraindications to the use of digitalis are fewer than was formerly thought. It is absolutely forbidden in cases of partial heart-block and we should hesitate to use it in cases of recent emboli, cerebral hemorrhage, aortic aneurysm and uremia, unless the need for it is imperative. In the tachycardia of hyperthyroidism and of cardiac neurosis it is useless and may do harm. Occasionally one finds a patient who has apparently an idiosyncrasy against digitalis; in such cases, it must be used cautiously or not at all.

VARIATIONS IN THE CLINICAL PICTURE OF GASTRIC ULCER.

By William Fitch Cheney, M. D., of San Francisco,

Clinical Professor of Medicine, Medical Department Stanford University, San Francisco.

Stomach disorder and dyspepsia still remain among the most frequent of complaints. Not every case of self-labeled stomach disorder, by any means, is due to primary disease of the stomach; and the fact has now been very definitely proved, by the investigations of many observers, that the stomach is frequently the organ to make the outcry when some other organ is really the injured one. Again and again this happens, so that one learns by experience to be sceptical in this day about the meaning of stomach symptoms. Yet organic gastric disease still exists; and the problem of sifting the true from the false is no less interesting because the true has been proved to be less frequent than we used to believe.

Of the two great and serious organic diseases that affect the stomach—ulcer and cancer—the former is the one that causes by far the more trouble in diagnosis, because it lasts the longer. Mistakes in the recognition of cancer do not long remain undiscovered, for the disease progresses rapidly and developments occur that soon bring about a revision of the original conception of the case. Ulcer, on the other hand, gives rise to an increase and decrease of symptoms throughout a number of years, so that at one time its existence seems a certainty, while at another one concludes that an error must have been made. All too frequently this indecision and hesitancy goes on until some serious complication forces an accurate diagnosis to be made by operation or by autopsy. Hence, in spite of what has been written on the subject of ulcer of the stomach and is constantly being written, there is still room for discussion in regard to many of its phases.

First of all, the clinical history of ulcer is by no means always the same: depending on the site of the ulcer; whether it is quiescent or active; and whether it has caused cicatrices or adhesions that involve other parts surrounding the stomach. It is impossible, therefore, to formulate any clinical history that will answer for all cases; and many errors in diagnosis arise from the effort to make the patient's story fit some preconceived idea of an ulcer history. It seems to be generally accepted, for instance, that ulcer is most frequent at the pyloric end of the stomach; and that symptoms of pyloric obstruction are essential in the diagnosis of any long-standing case. But this conception, on the one hand, entirely

ignores the cases of ulcer on lesser curvature or posterior wall, which may never lead to obstructive symptoms at all; and, on the other hand, leaves out of account other causes of obstruction at the pylorus, such as that due to long-standing cholecystitis with adhesions and coincident gastric hypersecretion, with an extensive history of acid dyspepsia and recurring attacks of pain, but no ulcer at all. Similarly, it seems to have been very firmly impressed in medical teaching that gastric ulcer gives rise to hemorrhage and the vomiting of blood; therefore, one man hesitates to diagnose ulcer if no history of hemorrhage can be obtained, and another is sure he is dealing with ulcer because hemorrhage has occurred, even though the history and physical findings point straight to cirrhosis of the liver. If there is any one symptom, the presence of which is absolutely essential to the diagnosis of ulcer, it is pain. Without this, gastric ulcer should be dismissed from the possibilities in the case, since it is the predominating and absolutely essential feature at some time or other in the course of every ulcer. Unfortunately, there are fallacies here also. Pain may be lacking over long periods of time, though the ulcer still exists; and, on the other hand, pain in the stomach, severe, persistent, resembling in every detail that of gastric ulcer, may be the most striking symptom, when not only no gastric ulcer exists, but the real disease is far away from the stomach, as in appendix or spinal cord.

From what has been said it can be clearly seen that clinical history, taken by itself, cannot be depended upon to make the diagnosis, but that careful examination of the stomach, as to its size, tone, motility and secretion, is always essential. And yet the fact remains that in many cases clinical history is all we have upon which to base our diagnosis, because physical examination proves practically negative. Hence, the uncertainty that frequently attends our conclusions in spite of every effort.

The following recent cases are presented in illustration of the variations in the clinical picture and consequent difficulties in the recognition of gastric ulcer. Numerous others seen, where gastric ulcer has been diagnosed but no proof has been afforded by operation, are not included, because it is not from these we learn. It is only when clinical deduction is proved correct or incorrect by direct observation on the operating-table that we discover the real value of our methods of diagnosis.

CASE I.—A man, æt. forty-three, first seen in June, 1911, complained of stomach trouble going on for a year. His principal complaint was of pain in the right side of his abdomen, at the edge of the ribs, sometimes felt under the right shoulder-blade. He had a good appetite, but feared to eat because two or three hours after a hearty meal his pain came on, with the formation and belching of gas, persisting until he vomited. The vomited material was always very sour and irritating, but after it came up his pain was relieved. He rarely missed a night without pain, which frequently roused him from sleep, and he never went more than two days at a time without it. So far as he knew, he had never vomited blood.

He was sent to Lane Hospital for investigation. Admitted there at 4 p. m.

one afternoon, he ate a hearty mixed meal at 5:30. At 7:40 he vomited a medium amount of cloudy fluid; at 8:10 and at 8.45 he vomited smaller amounts; at midnight and again at 12:30 a. m. he vomited a large amount of dark brown fluid; after that he went to sleep and slept till morning. He ate his breakfast at 8 a. m. and two hours later vomited eleven ounces of mixed material. On examination at this time his abdomen showed marked fullness in the epigastrium and both hypochondria, not more on one side than on the other; a definite wave of peristalsis across the stomach area from left to right; tenderness and rigidity in the right hypochrondrium at the costal margin; and a loud succussion splash over the stomach in spite of the recent profuse vomiting. A stomach-tube was then passed, and fifty ounces of semi-liquid material were evacuated, foul-smelling, containing food refuse of many days previous, much mucus and many dark brown flecks. The food vomited the previous evening showed on analysis a total acidity of 132, free HCl 56, combined HCl 46, and organic acids and acid salts 30. The next day, after the stomach had been washed clean of retained food, an Ewald test meal removed in one hour gave an analysis as follows: Total acidity 92, free HCl 30, combined HCl 48, organic acids and acid salts 14.

Considering first this man's history of persistent pain, with good appetite, recurrent vomiting several hours after food, and frequent nocturnal attacks of pain; secondly, the evidences of pyloric obstruction presented by his dilated stomach, food retention, and peristaltic wave; and, thirdly, the very marked hypersecretion found on chemical analysis, it seemed clear that he had either a gastric or duodenal ulcer obstructing the pylorus. The only other possibility was gastric cancer; and this was rejected because of the distinct history of pain making its onset only during the height of digestion, not persisting at other times after the stomach was empty; the absence of palpable tumor after a year's duration of symptoms; the preservation of a good state of nutrition even in spite of his long-continued struggle; and the presence of a high-grade hyperchlorhydria instead of a decreased secretion.

Refusing to consider operation, as advised, the patient returned to his home in Mendocino county. During the summer and fall he wrote to the writer several times, describing alternating periods of improvement and relapse, depending largely on how he ate. Finally he returned in January, 1912, ready for any procedure that was advised. At this time he related the same story of hearty appetite: distress caused particularly by solid food; fullness, pressure, nausea and finally vomiting coming on about three hours after eating, but not after every meal; heartburn and sour stomach; much belching of gas; awful pain in the right side of the abdomen below the border of the ribs, coming on several hours after food, localized in one spot and radiating through to the back, at times very severe in character, at others only a sense of soreness, lasting until he vomited or emptied the stomach, sometimes relieved by taking more food, but not always, also by taking bicarbonate of soda; vomiting attacks recurring every two or three days, often induced in order to give relief, usually the material being very sour water and the amount very large; once or twice he had noticed that the vomited fluid appeared bloody;

after eating meat he would vomit it in chunks two or three days later; every few nights he was disturbed by pain in the stomach and vomiting, obtaining no relief until he did vomit; every once in a while he noticed his passages were black for a day or two; following his previous visit in June, 1911, he had lost in weight for awhile, but recently had been gaining again.

Physical examination at this time showed greater fullness in the right hypochondrium than in the left; vigorous peristaltic waves running across the stomach from left to right; resistance and rigidity in the right hypochondrium; extreme tenderness at a point about midway between navel and right costal margin, localized there; and a marked succussion splash over the stomach, two hours after the Ewald test meal and six hours after breakfast. The ordinary Ewald test meal was taken at 12 m., and the stomach-tube passed at 2 p. m.; twenty ounces of material were then withdrawn, consisting of bread, egg and milk curds from the morning meal. An analysis of this showed a total acidity of 96, free HCl 60, combined HCl 16, and organic acids and acid salts 20.

With such a history, physical findings and stomach analysis, the patient was most confidently referred to the surgeon for operation for pyloric obstruction due to ulcer. The whole clinical picture could not possibly mean anything else. Operation by Dr. Stanley Stillman on January 12th, 1912, showed an extensive cicatrization and thickening caused by an old ulcer in the duodenum immediately beyond the pylorus, almost completely blocking the stomach's outlet. Gastro-enterostomy was done, the patient made an uncomplicated convalescence, and returned home on February 2nd, eating then a general mixed diet without discomfort of any kind.

CASE II.—A woman, æt. fifty-one, seen in consultation in August, 1911, stated that for thirty years she had had pain in the stomach more or less continuously. In 1889 she was treated for this by the Home of Truth, but no benefit resulted. The pain ultimately became so severe that she had to call a physician, and in 1897 a diagnosis was made of gastric ulcer. She was sent to a hospital, given rest and a systematic course of diet for ulcer; and for a time was much better. But gradually the pain again recurred. In 1899 she had a hemorrhage from the bowel. From that time on the pain had never been absent. It was always felt over the upper abdomen, running through to the back. It was relieved by eating for about two hours, then recurred, and persisted until food was once more taken. Formerly she vomited frequently, and years ago she noticed that the vomitus was dark and like coffee-grounds; but for a year or two past, she has vomited only at intervals and with difficulty, and the vomitus was never bloody. For some time past she had taken much morphine as the only relief for her pain.

This woman was small, pale and emaciated. The abdomen showed a visible and palpable mass, very tender to touch, occupying the epigastrium and both hypochondria, descending as low as the navel, dull on percussion, and in outline resembling the stomach wall. There was no peristaltic wave over this and no succussion splash. On inflation of the stomach with CO_2 no change was found in the dullness over the stomach wall, no peristaltic wave was elicited, but a great deal of pain was caused. After the Ewald test meal, the stomach

contents showed a total acidity of 88, with free HCl 56. Occult blood was found in the stomach contents, but none in the feces.

In this case the history of long-continued pain throughout thirty years, of repeated vomiting, frequent vomiting of blood, relief following a systematic ulcer cure but ultimate recurrence of all symptoms, all combined to make a diagnosis of gastric ulcer reasonably certain. But the ulcer was not obstructing the pylorus, for there was no evidence of dilatation, no food retention, no peristaltic wave. The presence of a tender mass across the gastric area, dull on percussion, this dullness not replaced by tympany when the stomach was inflated with gas, led us to the conclusion that the ulcer had extended down from the lesser curvature over the anterior wall, forming a thickened mass of cicatricial tissue there. The long duration of the symptoms and the presence of a hypersecretion of HCl seemed to negative the diagnosis of cancer; though it was recognized that cancerous degeneration might have ultimately taken place on the old ulcer base.

Operation by Dr. Emmet Rixford on August 15th, revealed a large ulcer on the posterior wall of the stomach that had perforated and attached itself to the pancreas. The mass found anteriorly proved to be the prolapsed liver, completely covering and obscuring the stomach itself from palpation. The ulcer was excised, and pathological examination subsequently showed no malignant degeneration. The woman made an uninterrupted recovery and has remained in good health ever since. She says she has just found out what it means to live.

Case III.—A large, powerfully built, Irishman, æt. forty-one, presented himself in September, 1911, complaining of stomach trouble. Always previously well and a hard-working man, he commenced to ail a little over three years before. He had a good appetite, but two or three hours after eating he began to be distressed by heartburn, water-brash, nausea and pain, culminating in a vomiting attack. Formerly the vomiting relieved the pain, but for some time past the pain persisted in spite of vomiting. The vomitus consisted of the food previously eaten, then of hot, burning, sour, acrid fluid. He was certain he had never vomited blood. Taking food would relieve his pain, temporarily, for an hour or two, but then it began once more. It was a curious part of his story that he always slept well all night and his rest was never disturbed by pain. During the three years of his trouble there had been brief intervals when he felt fairly well; but he had never been perfectly free, and recently had been much worse than ever before.

Examination of the abdomen showed greater rigidity and bulging in the right costal groove than in the left, with tenderness there and in the epigastrium, and a loud succussion splash over the stomach; but no dilatation, no peristaltic wave, and no palpable mass. After the Ewald meal, stomach analysis showed a total acidity of 120, free HCl 56, combined HCl 45, organic acids and acid salts 19. Both stomach contents and feces after a meat-free diet showed a marked reaction for occult blood.

Here again there seemed no possible doubt from clinical history, physical examination, and stomach analysis that the patient had a gastric

ulcer. The subjective and objective evidence was too clear to be mistaken, although there was lacking a history of hemorrhage, which after all is never essential to the diagnosis. It was also clear that this man's ulcer was not situated at the pylorus and was not causing obstruction.

Operation on September 18th, by Dr. Stillman, showed a large saddle ulcer on the lesser curvature, about 4 in. from the pylorus, unattached to surrounding structures and easily excised. The stomach was closed by an end-to-end anastomosis, the patient made a rapid recovery and has since remained perfectly well.

It is noteworthy that this man never had pain in the back. Pain there usually seems to be associated with ulcers that have perforated posteriorly and attached themselves to structures deep in the abdomen, such as the pancreas.

CASE IV.—A young man, æt. twenty-four, first sought the writer's advice for his stomach trouble in December, 1909. He had had this trouble for a number of years, but it was much worse during the past two years. His complaint was of dull pain in the upper abdomen, formerly on the right side under the ribs, now in the epigastrium. It usually came an hour or two after eating, but gradually wore away. Taking food would relieve it temporarily. He was not often nauseated and very rarely vomited. At times he was much annoyed by belching and at times by water-brash. His appetite was craving.

The patient was a small man, pale and not well nourished. There was no abnormality in the contour of the upper abdomen, no tenderness on palpation, no perceptible tumor, no peristaltic wave; the greater curvature did not descend below the navel; the only significant fact was the presence of a loud succussion splash over the stomach at long intervals after taking food. After the Ewald test meal six ounces were obtained by the tube, almost entirely liquid, pearly and opaque, showing no retained food from the previous meal; the total acidity was 68, the free HCl 58, the combined HCl 4, the organic acids and acid salts 6.

Clearly enough this patient had an atonic stomach with hypersecretion; but only by inference could one diagnose ulcer. He was given a diet suitable to his hyperacidity, drugs to restrict and neutralize the secretion, and at once improved greatly, losing his pain entirely, gaining in weight and having none of his old symptoms. This happy state of affairs continued for nearly six months.

But in 1910 he presented himself again, stating that for a month past his pain and all his other symptoms had gradually recurred as severely as ever. His pain, varying in severity, came on also at a variable interval after taking food, which temporarily gave relief. He was nauseated at times but never vomited. He had much distress at night, disturbing sleep. He was this time placed in Lane Hospital and a thorough investigation made; but the findings were in no way different from those in the previous December and January. The most noteworthy points were the succussion splash and the marked hypersecretion: the total acidity at this time being 92, the free HCl 60, the combined HCl 12, and the organic acids and acid salts 20. The feces showed no occult blood. Nevertheless,

he was put upon a systematic diet for ulcer; his symptoms all disappeared gradually, and he considered himself cured.

After that he remained well for a year; but in September, 1911, he was back again with the old pain and other symptoms, all of which had returned during the previous six weeks. Again the findings were simply those of hypersecretion, with splashing, atonic stomach, but no marked tenderness, no peristaltic wave, no dilatation. Nevertheless he was by this time weary of cures that did not cure, and ready to accept the advice to have operative treatment for gastric ulcer. Accordingly, on September 22nd his abdomen was opened by Dr. Stillman. An ulcer was found at the pylorus, apparently about the size of a quarter of a dollar, with white, thick, fibrous base, crossing the pylorus to the duodenum. A gastro-enterostomy was done and no excision made. The patient made an uninterrupted convalescence from the operation, and up to the present time has had no further stomach disorder.

This case was to the writer one of the most convincing proofs possible of the uselessness of medical treatment in chronic gastric ulcer. Our patients get well apparently under various regimes of diet and medication, but they do not remain well; and sooner or later they find their way back to us or to some other adviser, to be cured again. For such cases surgical procedure seems to offer the only possible permanent relief.

CASE V.—A woman, æt. twenty-four, seen for the first time in September, 1911, gave the following history. She was always well until three years before, when she began to have attacks of stomach trouble characterized by burning pain in the epigastrium, coming on half an hour to an hour after eating, and lasting for several hours. The first attack of this sort lasted only a month, then she was well for a year, then she had another attack for a month. This alternation continued, but the attacks gradually grew more frequent and the intervals of good health shorter. For the past six months she had suffered constantly and severely. Her pain, she insisted, always came an hour after eating, was felt particularly in the epigastrium and left hypochondrium and radiated to the left breast and into the back to the left side of the spine. Recently, she had been troubled particularly at night, when the pain would rouse her from sleep. She vomited occasionally, and at times induced vomiting, because it always gave relief. The vomitus consisted of a sour, burning fluid. She had never vomited blood; but for two weeks previous she had noticed that her bowel movements were black.

On inspection of her abdomen, the left hypochondrium was fuller than the right, but there was no other abnormality in contour. On palpation, tension was increased in the left hypochondrium, and rigidity was so great there that it interfered with deep palpation; there was no tenderness except in the epigastrium; and no mass to be felt anywhere over the stomach area. On inflation with CO_2, the greater curvature was found 2 cm. below the navel; no peristaltic wave and no tumor was brought out by inflation. After the Ewald test meal the total acidity of stomach contents was found to be 107, the free HCl 49, the combined HCl 31, the organic acids and acid salts 27; the stomach contents gave a decided reaction for occult blood. The feces were black and like tar, and gave an immediate and marked reaction for occult blood

With such a history, physical signs, and laboratory findings, the diagnosis of gastric ulcer was made without hesitation. The woman was operated upon by Dr. Stillman on September 20th, and a small indurated ulcer, about the size of a dime, was found on the posterior wall; it had perforated the stomach wall and its base was formed by the pancreas. This ulcer was excised and a gastroenterostomy done. The patient recovered without incident and has since remained well.

CASE VI.—The following case, though not so recent as the others presented in this paper, has not been reported previously, yet conveys lessons that none of the others does. A man, *æt.* thirty-six, an Irishman by birth, a boiler-maker by occupation, was first seen in November, 1908, complaining of pain in his stomach. He had had distress after eating for four or five years past, but not any serious suffering until the preceding July. From that time on, now better, now worse, he had had severe pain coming on three or four hours after food, persisting until the next meal which usually relieved for awhile. The pain was felt in the epigastrium, radiating through to the back, just to the left of the spine. He vomited occasionally but had never vomited blood, and his stools had never been black. His bowels were obstinately constipated. It was a most significant point in his history that he had lost 32 lb. in the five months since his severe trouble began.

The patient was a man of large frame, but poorly nourished and looked anemic. He pointed to the epigastrium, about one inch below the ensiform, in the median line, as the site of a tender spot. All over the stomach and upper abdomen marked rigidity was found, but no palpable tumor. There was no succussion splash and no peristaltic wave. Slight tenderness was found posteriorly, opposite the 10th and 11th thoracic vertebræ, just to the left of the spine. After the Ewald meal two and a half ounces of stomach contents were obtained, dark brown in color and poorly triturated; the total acidity was 76, the free HCl 44, and the reaction for occult blood was marked. The stools after a meat-free diet likewise gave the reaction for occult blood.

It was recognized that while this case presented many of the symptoms and signs of ulcer, there were some not explained by this diagnosis: such as the great loss in weight, the rigidity over the entire stomach, the marked tenderness and the unusual severity of the pain. Operation was nevertheless indicated and was therefore performed on November 16th by Dr. Stillman. It revealed a large ulcer on the anterior wall of the stomach, near the lesser curvature, nearer the pylorus than the cardia, attached to the liver and requiring dissection from it; the inner surface showed an ulceration the size of a half dollar, with great thickening and fibrosis, the edges elevated and nodular around it, and folds of mucous membrane much hypertrophied. The entire area was excised.

Dr. Ophuls reported on this excised specimen as follows: "Large ulcer of stomach, with marked thickening and induration of edges; sections show at edges, in the mucous membrane, submucosa and muscle, large irregular glandular spaces, filled with a very atypical epithelium; in one place the tumor in the mucous membrane reaches the edge of the specimen; in places the tumor extends all the way through the stomach wall. Diagnosis: chronic ulcer with development of carcinoma."

This patient recovered promptly from his operation, but returned six months later with a large nodular mass in his upper abdomen, undoubtedly due to recurrence of his malignant growth. The condition was considered inoperable; and he died a few weeks afterwards.

This case calls attention to one of the great dangers of letting a chronic ulcer go too long without excision; namely, that it forms an excellent site for malignant degeneration. It is a peculiar fact, that even when this has taken place, the stomach analysis may still show a high grade of hyperchlorhydria, as in this case. The presence of abundant free HCl in stomach contents may easily lead the unwary to assume that carcinoma does not exist; and it is well to remember that cancer developing on an ulcer base is often accompanied by hyperacidity. It is also important to remember that this patient was only thirty-six.

CASE VII.—A man, æt. fifty-four, first consulted the writer in September, 1911, for a disturbance of digestion present for about five years. The examination and laboratory findings indicating the presence of a gastric ulcer, he was placed upon suitable diet and medication, and for a time his symptoms were less troublesome. But in February, 1912, he returned because his trouble had all recurred. He had a good appetite, but complained of belching, water-brash, and pain coming on two or three hours after eating. He had pain pretty constantly in spells lasting for weeks, never absent more than a few days at a time; coming always some hours after food, and usually relieved temporarily by eating; always worse at night, rousing him from sleep about midnight and disturbing his rest until towards morning; felt over rather a wide area in the upper abdomen between the navel and the ribs, most often to the right of the middle line; in character a dull ache. There was no nausea and no vomiting, and there never had been. Examination of the stomach showed: (1) As regards *size*, it was distinctly dilated, for on inflation the greater curvature was found 3 cm. below the navel; (2) as regards *tone*, it was impaired, as marked succussion splash was found over the stomach six hours after food had been taken; (3) as regards *motility*, it was likewise impaired, for one hour after the ordinary Ewald test meal, consisting of two slices of toast and half a pint of hot water, twelve ounces of contents were obtained showing fragments of the previous meal eaten six hours before; (4) as regards *secretion*, the test meal showed hyperchlorhydria, the total acidity being 72, the free HCl 36, the combined HCl 24, and the organic acids and acid salts 12. From these data, gastric ulcer was diagnosed, probably obstructing the pylorus; and as no definite improvement had followed medical treatment, operation was advised. This was done on February 24th by Dr. Rixford. At the pylorus there was found a thickening and hardening with constriction, evidently due to the scar of an old ulcer; while, on the lesser curvature, some distance from the pylorus, there was another area of thickened and indurated tissue which it was thought best to excise. This portion, viewed from the inner side, showed three separate ulcers; the largest the size of a dime, deeply penetrating the wall of the stomach, and one extending through all the coats and only covered by fibrotic scar-tissue at its base. Besides the excision a gastro-enterostomy was done, and the patient made a good recovery from the operation; but it is too soon to state the ultimate outcome.

CASE VIII.—A young man, æt. twenty-three, was sent to the writer from the country by his physician in September, 1911, with a ready-made diagnosis of gastric ulcer. The patient complained of pain in his abdomen after eating. This began about two years before, but was much sharper now than at the outset.

He had a good appetite and enjoyed his food. Some days he had no pain at all, on other days a great deal. Usually his pain came immediately or half an hour after food was taken; but was never severe enough to make him stop work or to prevent sleep. He had no nausea or vomiting, but much belching of gas, extremely offensive in odor. The bowels were not constipated. When questioned, the patient felt sure that his pain was always worse for a few days after an automobile ride or a buggy-ride, or any exercise that caused jarring.

He was a tall, ruddy, well-nourished man, apparently in perfect health. The abdomen showed no abnormality whatever in the upper half; no tenderness over the stomach, no palpable mass, no succussion splash, no peristaltic wave, no evidence of dilatation; he pointed, however, to the left hypochondrium as the site of his pain. In contrast to this lack of findings over the stomach area, there was definite thickening and a palpable mass in the appendix region with tenderness on manipulation; and deep palpation over the appendix caused increase of the pain in the left hypochondrium, which he described as his regular pain. After the Ewald test meal only two ounces were obtained, mostly liquid; but this showed a total acidity of 80, with free HCl 30, combined HCl 30, and organic and acid salts 20.

It was clear that this patient's gastric symptoms were due to hyper-chlorhydria, but there was no evidence that his abnormal secretion was in turn due to an ulcer. On the other hand, there was definite evidence of the existence of a chronic appendicitis, which reflexly might cause the hyperchlorhydria. The history did not point directly either to ulcer or appendicitis. The patient was advised that his symptoms were probably those of "appendix dyspepsia" and that the appendix, not the stomach, was the proper point of attack.

The writer subsequently heard from the patient that he was operated upon by Dr. Jackson Temple in Santa Rosa, and the appendix found chronically inflamed, with many adhesions. Following its removal, his stomach symptoms had entirely disappeared.

Case IX.—The last case to be reported at this time is in many respects the most remarkable of all. A Scotchman, æt. forty-one, was first seen in the medical ward of Lane Hospital in October, 1911. He said he had had stomach trouble for ten or twelve years. For a long time he had had sour eructations after eating, and belched a great deal of gas. About two and a half years previous he commenced to have attacks of vomiting, and continued to have them every few days after that for the next year. He never vomited any blood or passed any by bowel. His attacks had no particular relation to the taking of food. For the past year he had also suffered from severe attacks of pain, coming on suddenly at irregular intervals but never at night, most often in the afternoon. This pain was felt in the pit of the stomach and was usually relieved by vomiting. Three months before coming to the hospital, his abdomen had been opened, his stomach thoroughly explored, and no abnormality found.

This patient was found to have inequality of his pupils, the right being markedly larger than the left; neither pupil reacted to light and the left only slightly to accommodation, the right not at all; the left Achilles tendon reflex was absent but the right was lively; there was hyperesthesia to heat and cold over both lower limbs from knees to hips and over the trunk to axillæ; and there was a positive Wassermann reaction both in blood and in spinal fluid. Upon

these findings a diagnosis was made of tabes dorsalis with gastric *crises.
He was then given salvarsan intravenously. Following this injection in October
his crises became less frequent, less severe and shorter in duration; but as they
did not disappear, he returned in February, 1912, and was given another injection
of salvarsan. He was very enthusiastic about the effects of his previous injection,
which he said had given him more relief than any other procedure previously
employed. What the ultimate outcome will be still remains to be seen. Mean-
time the case teaches the valuable lesson that gastric crises may mimic gastric
ulcer paroxysms so closely as to mislead good observers at times into recom-
mending an unnecessary laparotomy.

Conclusions.

From these cases of gastric ulcer, where the diagnosis has been actually
demonstrated, a number of facts stand out that deserve to be emphasized.

(1) There is no absolutely certain clinical history of ulcer; for the
symptoms vary widely in different cases and at different times in the
same case.

(2) Nocturnal pain, arousing from sleep, does not always mean duod-
enal ulcer, as so great an authority as Moynihan would have us believe;
for, as proved by the cases reported, it may occur as well when the ulcer
is gastric and far from the pylorus.

(3) Hematemesis may never occur in the course of a chronic gastric
ulcer, and its absence from the history is no bar to the diagnosis.

(4) Vomiting of any kind may never take place throughout the en-
tire course of the ulcer history.

(5) Pain is the one symptom that most unfailingly presents itself at
some time and is the most constant complaint in most cases; but this pain
varies greatly in severity in different cases and at different times; also as
regards the site at which it is felt and the time after eating at which it
occurs.

(6) It is always important, in estimating the meaning of a gastric
history resembling that of ulcer, to remember the possibility of reflex
gastric symptoms from chronic appendicitis, or chronic cholecystitis, or
intestinal parasites such as tapeworm, as well as the gastric crises of
locomotor ataxia.

THE USE AND ABUSE OF THE LIGAMENTUM TERES UTERI.

By Fred W. Bailey, M. D., of St. Louis.

So many monographs on the round ligaments of the uterus have been written, and so many operations devised for the correction of the supposed abnormalities or pathological conditions, that the beginner is led to look upon them with much respect and as extremely important members of the uterine adnexa. Not until one has performed several so-called successful shortenings and learned to his sorrow that backache, dysmenorrhea, and the many reflex and concomitant symptoms incident to retroversion do not cease, does he experience the desire to perfect an evidently faulty technique. The further one progresses along the road of experience, the more confidence he has in the methods of nature and the more earnest are his endeavors to follow her own peculiar lines of architecture in the repair of her structure. We may exult over a master-surgeon's wonderful technique and the ingenious operations which he devises; but a careful review of the hundreds of procedures suggested for the repair of any part of the human organism will convince one of the fact that only those methods will stand the test of time that have as their prime and persistent object the return of these structures to their normal condition.

In a brief review of the embryological developments of this part of the body with which we have to deal, we learn that the male and female generative organs develop primarily from the Wolffian body; that both are present in every human embryo (which leads one to believe that sex differentiation is held in abeyance until fetal life is fairly started and is possibly susceptible of influence); that from the Muellerian ducts are developed the female generative organs, while the male generative organs are chiefly developed from the Wolffian ducts; that the testis is analogous to the ovary, the prostate to the vagina and possibly the uterus; that the gubernaculum testis is analogous to the round ligament; that the testis and ovary originally develop at the same site, and are both connected by a muscular ligamentous band to the site of the internal abdominal ring and that both undergo descent. This analogy is more forcibly portrayed by the fact that the ovary has in several instances descended to and through the inguinal canal, directed there, of course, by the round ligament.

Nature herself is so lenient that no two structures in the animal and vegetable kingdoms are perfectly identical. Therefore, we do not term as abnormal every anomalous condition which deviates slightly from the

majority. It will be found in most anomalies that Nature's principles are not antagonized. For instance, there is no exact height to which the bladder attachment should reach on the fundus; no exact size or length for all round or uterosacral ligaments, but it is necessary that we be able to recognize pathological conditions or anomalies which are destructive to these principles.

A thorough knowledge of anatomy is an essential part of the equipment of every surgeon, and no one should attempt the repair of a pathology unless he is thoroughly familiar with the normal. A few words, therefore, relative to the anatomical relations of the parts referred to in this paper may refresh our memories.

The uterus lies normally within the pelvis, between the bladder anteriorally and the rectum posteriorly, flanked on either side by the peritoneal folds, known as broad ligaments, which, besides balancing the uterus, transmit the vessels, lymph channels and nerves, and support the Fallopian tubes and ovaries, the round and ovarian ligaments, and the remains of the Wolffian ducts. The fundus of the uterus is freely movable in any direction. The cervix which enters the vagina at a slightly obtuse, almost right angle, is further fixed by a firm attachment to the bladder anteriorly and a firmer attachment through the uterosacral ligaments to the posterior pelvic wall. The pelvic outlet is occupied by the urethra, vagina, perineal body and rectum, supported by ligamentous and muscular attachments, chief among which are the levator ani and the triangular ligament. The levator ani muscles pass down along the sides of the vagina towards their insertion at the perineal body and support the vagina more by embracing it than by direct muscular attachment. The atmospheric pressure which acts through the floor of the pelvis is one of the chief factors in preventing prolapse of the pelvic viscera, and its action is proportionately lessened by any marked relaxation of the vaginal or rectal outlet. (This can be easily demonstrated by grasping the cervix with a small vulsella, and noting the ease with which it can be drawn down with the speculum in place and the resistance when the vagina is collapsed about the vulsella.)

In a normal pelvis, the uterus should be supported from below by a good firm perineum, and the atmospheric pressure which such a perineum insures. The cervix should be firmly set in the vault of a vagina that is capable of a normal collapse, and is supported on either side and posteriorly by healthy functioning levator ani muscles. The cervix should also be attached posteriorly to the rectum and sacrum by the musculofibrous uterosacral ligaments, directing its axis backward. The fundus of the uterus should be freely movable in every direction to accomodate itself to the ever-changing conditions incident to position and the physiological functions of the parts; the broad ligaments should be lax enough to permit of lateral deflection without tension, and firm enough to support the tubes and ovaries without prolapse into the cul-de-sac. Mod-

erate antiflextion is a normal position, the uterus forming a curve from the cervix forward, varying in degree with the distension of the bladder upon the vault of which it rests. The round ligaments are merely musculofibrous guy-ropes with absolutely no power of suspending the uterus when the patient is in the erect position. In the prone position, they do, if acting normally, prevent extreme retro-displacement of the fundus, and are here to a degree suspensory, but their pelvic attachment at the internal ring is no higher and often lower than their uterine insertion, and they can only influence the position of the fundus through this guy-rope function varying in power and effect, dependent upon their length and the contractility of the muscular inner third. It is true, that in most conditions which are operated for non-inflammatory uterine displacements and prolapse, these ligaments, together with the broad, ovarian and utero-sacral ligaments, have been forced to functionate, however feebly, as suspensory ligaments, but their laxity and weakness in these conditions is due to the abnormal use to which they have been put and not to a failure on their part properly to fulfil their intended function. It is as essential to reason from cause to effect in surgery and pathology, as it is in physics and philosophy, and not one nor all of the operations devised for repairing the ligaments of the uterus will prove a success, when the real cause is undisturbed. It is not the weight of the uterus and adnexa that stretches and demoralizes these ligamentous attachments, but it is the constant intra-abdominal pressure released by perineal relaxation from any cause, and freed by a relaxed and air-filled vagina, which disrupts the normal atmospheric resistance of the perineum.

In the correction, therefore, of these conditions, we must first correct the cause, whether it be a lacerated perineum, a weakened condition of the floor of the pelvis, or an intra-abdominal condition due to new growths, diseases of the bladder or rectum, or post-inflammatory adhesions. Then, when once the cause is removed, whatever work is done on the ligaments, keeping in mind their true and not imposed function, will be successful.

In those cases which have severe functional menstrual disturbances with retro-displacements, uterus not fixed, perineal floor intact and no intra-abdominal lesion, such as is often found in young anemic girls, complete relief can usually be obtained by restoring the relaxed muscular tone by building up the patient and bringing the fundus forward by the simple subcutaneous shortening in the canal of Nuck. When the abdomen is opened, after the cause of a displacement has been removed and the pelvic outlet repaired, the method of restoring the ligaments to their normal use depends entirely on each individual case.

The writer has no intention of assailing any of the well-known methods, whose authors have been and are masters in their special line of work, except in so far as they deviate from well-known principles of surgery, based upon the anatomy and physiology of the parts. Ex-

perience, in all the various methods of round-ligament shortening that have been devised, teaches one that any of them will serve if the cause has been removed. Any operation, which shortens the ligament from its fibrous end, is the most ideal, for the uterine third or half is largely muscular and this muscular section should be disturbed as little as possible if the complete function is to be preserved. This is not practical in all cases, but the same principle is followed when the ligament is brought through the anterior abdominal wall, either external to, or through, the rectus and its sheath. When this operation is done, there is left a loop between the internal abdominal ring and the new point of exit. This danger is obviated by light scarification of the ligament forming the loop and one or two Lembert sutures drawing peritoneal folds over this exposed portion, or the introduction of a purse-string suture.

Whether the ligament should be brought through or external to the rectus is of importance. In the transmuscular route, adhesions form between the muscle and fascial structures, and prohibit or limit, to a degree, the mobility of the muscle in its sheath. The writer has seen 3 such cases in which movements involving the recti were accompanied by pain at the exact point where the ligament had penetrated. Again, when the two ligaments are brought through the wall near the line of incision or near the middle of the recti, we have formed an unnatural pocket bounded by the anterior abdominal wall and the uterus, and by the round ligaments which have, of necessity, carried with them their broad ligament peritoneal folds. Hundreds of such cases might result in no trouble, but it is faulty technique and therefore questionable surgery. Those operations which fold the ligaments at their internal extremities have many advocates. The principle is not bad where proper technique is observed, and often gives excellent results. It is applicable where the round ligament is not sufficiently free to allow the transfascial method to be used, and possesses the disadvantage of putting out of commission the functionating part of the ligament. This method necessarily results in a folding or plicating of the broad ligaments, thus shortening the latter, a distinct advantage. In plastic work on any muscular structure, it should be our effort to avoid trauma or any constriction of the circulation, if we expect continued function. This ligament, muscular at this extremity, is no exception. When it is to be drawn through the abdominal fascia, it should be done by aid of a ligature or a specially devised instrument, and not by the crushing force of a forceps. When it is to be folded on itself or doubled upon the fundus of the uterus, the sutures should be passed near the margin of the ligament. In the thin attenuated variety, they should be spread over a larger area of the fundus with several superficial sutures, keeping in mind the necessity of irritating the surfaces to be opposed with gauze or knife, and of so attaching the ligament that the pull will be upon the superior posterior, and not anterior aspect of the fundus. It matters but little whether the round

ligament is passed through the broad ligament and attached posteriorly, or whether it is brought over above, provided in the latter case, the point of crossing the fundus is sufficiently internal to the origin of the Fallopian tube to prevent constricting or kinking it. In any form of intra-abdominal shortening, the pull on the uterus should be as far above the centre of gravity as possible, and the uterine attachment, which in cases of long standing has often stripped down on the body of the uterus to a point below the centre of gravity, should be transplanted to the more advantageous point. There is also a tendency to bring the uterus too far forward, fixing it, as it were, to the anterior wall. This should be discouraged, for it is productive of much pain and inconvenience from cystic and reflex irritation, and prohibits the normal distension of the bladder. This severe form of shortening will not, in any particular, improve the patient's chance of relief over the degree designed by Nature; for as previously stated, the ligaments must not be expected to support or suspend, since the foundation—the perineal body—is the supporting structure, and the ligaments are to be manipulated only with the intention of directing the axis of the uterus in a manner that will permit the constant intra-abdominal pressure to exert itself upon the posterior surface.

The method which appeals to one as being least defective is not based upon the technique adopted in shortening the round ligaments, but in the proper recognition and repair of the perineum and cervix, and in removing the cause, whatever it may be. The writer is convinced that in many cases, if this is observed, the round ligaments would readjust themselves to such a degree that their function would be restored. As time will not permit, all considerations relative to the readjustment of the broad and sacro-uterine ligaments and perineal repair have been omitted. In the intra-abdominal method in these attenuated ligaments, it is preferable to bring the ligament out to or through the fascia just external to the rectus and fasten it there, or as far centrally as the median line, the point at which it is fastened being determined by the position assumed by the uterus, securing as normal a relation as possible. A peritoneal fold is then sutured over the loop, thus left to insure against any protrusion of intestine, which we know is always resident in this portion of the abdomen. If the uterine end has been stripped down by long continued pulling, it should be transplanted up over the fundus. In cases where the round ligament is large and fully developed throughout, as in most short-standing cases, the ligaments can be doubled back over the fundus, spreading them out by superficial sutures over an abrased area, taking care not to constrict or devitalize the structure, or brought through the broad ligament below the ovarian ligament, close to the uterus and attaching them to its posterior superior surface,—placing the fundus virtually in a round ligament sling after the recently suggested method. All oozing of blood should be completely controlled by hot saline sponges to insure against undesirable adhesions.

A well-known internist has remarked: "We only know that we have removed the offending agent when the symptoms disappear." Unfortunately, the results of surgical interference are not always ideal, but we are inclined to adopt and adhere to those methods which in our hands give the highest satisfaction to patient and physician. The writer has had occasion to reoperate a number of cases in which various forms of shortening of the ligaments had been performed; and in every one in which the pelvic floor had been ignored—and this is often done—there was a complete failure. In 3 cases reoperated for acute conditions, in which had been employed the simple methods herein described, the results were all that could be desired.

For the sake of brevity, the writer has avoided introducing the names of the surgeons who have suggested the many methods and modifications with all of which the reader is familiar. The object is not to suggest an improved method, for those we have will answer all purposes, but to emphasize the necessity of recognizing and correcting the cause of the deformity, after which, the application of any of the modern methods which are based on true surgical principles will give the desired result.

Conclusions.

1. Close observance of Nature's laws and methods is essential to success.

2. The resistance of the pelvic outlet determines the degree of pelvic ptosis. The levator ani and triangular ligament are prime factors in perineal support. A relaxed perineum destroys the value of atmospheric pressure and permits unimpeded action of intra-abdominal pressure on prolapsed pelvic viscera.

3. The uterus, normally, is one of the most movable visceral organs. Any direct fixation of the fundus is unnatural and not productive of good results. The round ligaments functionate only as guy-ropes, and should not be compelled to act as suspensory ligaments.

4. All repair of uterine displacements must be directed primarily toward the removal of the cause, and the readjustment of the pelvic floor and ligamentous attachments as near as possible to their normal relations.

5. Minor points in technique.

Metropolitan Bldg.

CHRONIC UNIVERSAL PERIHEPATITIS.

By Reynold Webb Wilcox, M. D., LL. D., of New York,

Formerly Professor of Medicine at the New York Post-Graduate Medical
School and Hospital; Consulting Physician to St. Mark's and
to the Nassau Hospitals.

It may seem singular that the writer has chosen a comparatively rare disease for discussion, a disease of which there are probably less than three hundred recorded examples, but he has two reasons for this. The first is that attention may be called to it so that in medical literature it might become less rare; and, secondly, that after prolonged study of the literature and a careful employment of the rather vague suggestions as to the treatment, the writer has at last found a remedy which yields brilliant results, at least in the acute exacerbations.

Chronic universal perihepatitis, as that most unusual pathological condition is designated, rejoices in a number of names out of all proportion to its frequency. For instance, it has variously been called panserositis, polyserositis, multiple serositis, hyaloserositis, polyorrhomenitis, or pericarditic pseudo-cirrhosis of the liver. In Italy, where this condition is limited chiefly to the peritoneum, it is known as Concato's disease or phthisis of serous membranes. In France it is generally designated as perivisceritis, or better as *symphyse pericardo-perihépatique*.

Although this disease has been recognized for many years it did not receive attention until Pick published his article in 1896. Since then it has been generally known as Pick's pseudo-cirrhosis. The earliest recorded instance of the disease is probably that of Van Deen in 1846. The *Zuckergussleber*—frosted liver—described by Curschmann in 1884, was already known to several writers, of which presumably Rokitansky was the earliest, the record being 1842.

About 1883 the writer was asked, by a gentleman, who has since become one of our most distinguished gynecologists, to be present at an operation for tubal disease. At that time laparotomy was by no means as frequent as it is now, and the peritoneum was the Rubicon to be approached with a certain amount of apprehension, and when traversed, a considerable amount of trepidation was felt. In this particular instance, as the operator reached the peritoneum, to his great astonishment and evident loss of mental balance, his knife came down upon a solid calcareous wall. Further exploration and investigation revealed the fact that this calcareous wall was the mesentery, which, over a large area, was literally as solid as a rock. Celiotomy having been accomplished, ex-

cavation revealed a complete calcareous cast of ovaries, tubes and upper surface of the uterus with patches in various other parts of the peritoneum. Calcareous casts of the tubes, as well as calcareous casts of the crypts of the tonsils and of other mucous cavities, are by no means unusual, but a calcareous cast of an organ covered by a serous membrane, or a calcareous plate on a serous membrane, was something which had not hitherto been encountered. The specimens from this patient, together with a history, were presented to the New York Pathological Society, and are doubtless still retained in its museum.

In 1894, there came under the writer's care a patient who apparently was suffering from an acute pericarditis. Within a few days a pleuritis, either developed or made itself more manifest, and the patient went on to recovery; but the adhesions apparently formed at a much earlier day than one would be led to expect, and in that respect the pericarditis as well as the pleuritis seemed unusual. There was no reasonable doubt as to the accuracy of the diagnosis. Of course, since the effusion was slight, Ewart's sign and Auenbrugger's sign were absent. On the other hand, Friedreich's sign, Kussmaul's sign, although this is of comparatively little importance, and Broadbent's sign were well marked. Shortly after the pericarditis had subsided, as well as the acute manifestations of the acute pleuritis, ascites developed. The amount of fluid in the peritoneal cavity became enormous, and contrary to the rule which obtains in ascites due to chronic interstitial disease, there was not the ordinary contracted liver, there was no edema of the legs and no anasarca. The fluid became so great in amount and interfered so much with the respiration and the comfort of the patient that paracentesis was performed by Dr. C. J. Mooney, who at that time was associated with the writer in practice; some 500 oz. were removed. This fluid was of a specific gravity of 1,015, and contained about 3 per cent. of albumin which the writer believes would be classed by the pathologists as an inflammatory exudate. The abdomen, in the course of two or three weeks, refilled, and a much smaller quantity was removed possessing the same characteristics. After a longer interval a similar, but still smaller quantity, was removed. This was repeated twice or three times more and the ascites ceased to reaccumulate. The next striking feature of the situation was that, in spite of the large amount of fluid removed and the repeated tappings, the patient's health was not in any way impaired. Bearing in mind the observation made at Guy's Hospital, London, and the deductions from those observations, viz., that the patient with ascites very rarely survives the third tapping, again there was a suggestion that an unusual condition was present. The literature threw but little light upon the subject until the publication of Pick's paper in 1896, and the condition was then recognized. The patient is still alive, has suffered from recrudescences of the disease, marked as to the pericardium, more especially as to the pleura, but has remained in a fair condition of health.

The second patient came under the writer's care a few weeks before he saw Pick's paper. This patient has had repeated attacks of pain over the pericardium, fainting, high fever; in fact, what might be ascribed to attacks of acute pericarditis. When the writer saw her at first the fluid in the cavity was not great, but on examination he found the liver surface, which on palpation was shown to be distorted, uneven: a large mass, easily palpable, suggesting cancer. The pericardium was markedly adherent. The general condition of the patient seemed to disprove cancer as the probable diagnosis. The late Dr. E. G. Janeway saw the patient with the writer, and made the positive statement that the patient was not suffering from cancer of the liver. The writer succeeded in developing no other information. This patient has been under his observation since that time, has suffered from repeated attacks of pleuritis, has had more or less ascites, and is still alive and in good condition. Pick's paper gave the writer the diagnosis in both instances.

Since then the writer has met two other instances, in private practice, which are indubitably those of Pick's pseudo-cirrhosis, and he has seen one and possibly two others in consultation with other physicians. Now we have a condition of affairs which, in its inception, is in the vast majority of instances a pericarditis apparently indistinguishable from the ordinary pericarditis without the effusion, or possibly with the little effusion which is commonly met with, and by no means uncommonly overlooked. In a smaller proportion of instances acute pleuritis is the beginning. In all instances with which the writer is familiar, the recrudescences have been chiefly without fluid. The only remarkable characteristic of either pleuritis or pericarditis is the rapidity with which adhesions are formed.

Now, the second most noticeable condition is the ascites, an ascites which is primarily relieved by paracentesis and which is not accompanied by edema of the legs or genitals. And, in spite of the numerous tappings necessitated by the accumulation of fluid, the patient's health remains unimpaired. The triad formed by the pericarditis, pleuritis and ascites constitutes Pick's pseudo-cirrhosis.

As to the liver, it may either be but slightly changed, or underlying the capsule there may be some proliferation of interstitial tissue, or in the later stages we may have nutmeg atrophy, red atrophy, or the usual hepatic cirrhosis. When we have the *Zuckergussleber*—the frosted liver—its appearance is perfectly characteristic, resembling closely the frosted cake of the confectioner. When this soft material is removed from the liver, which in the early stages can be done without much difficulty, it will at once be seen that it is lamellated, grows in layers, and can be removed in this way, layer by layer. And when the serous membrane is reached it is often found little changed. In this frosted-liver exudation the lime salts can be deposited, the same as in pathological material coating the tubes, the omentum, the small intestine,

or other organs covered by serous membranes. This deposit, when extensive, would give rise to the condition mentioned in the first instance here cited, and which so much discomfited the gynecologist.

It has been known that the diseases which are apt to precede this condition are enteric fever, pertussis, syphilis, acute polyarthritis, and even malaria. So far as any of these diseases being the cause of pseudo-cirrhosis, the question is extremely debatable. A very considerable proportion of the recorded instances of this disease has originated in Italy, and especially in those years during which malaria was rife. It has been the custom among pathologists, at least, to ascribe most adhesive conditions of serous membranes to tuberculosis. As late as 1903 the subject was quite thoroughly studied; in some instances of this disease at least the absence of tuberculosis has been proved, culture experiments having been made use of. On the other hand, it is only fair to say that some patients who die of this disease, and especially of that variety which has been designated by the name Concato, do die of tuberculosis. As the course of events varies so much from the usual serous membrane tuberculosis, Cantu hazards the conjecture that it may be of special origin; for instance, of avian. Further than this it is impossible to go.

Almost invariably the pericardium is affected, and generally the first; however, a primary pleuritis and secondary pericarditis are not unknown. In a larger proportion of instances there is also a pleuritis; and the ascites in consequence. The amount varies very considerably. It would seem at first that the term pseudo-cirrhosis was an unfortunate one, but the more one studies this disease the more one is inclined to think that perhaps the term was not badly chosen, though cirrhosis in the strict sense of the term has but little to do with the disease. Jaundice, one of the ordinary symptoms of the diseased liver, is invariably absent. The various conditions that have been suggested for the cause of the disease are all unsatisfactory. Whether of bacterial origin, or of mechanical origin resulting from the pericarditis and the various arguments against this particular form, is the fact that in cirrhosis, which follows pericarditis as we understand it, the early symptom is a brown atrophy of the liver and not what we find here. The kinking of the larger abdominal blood-vessels is more frequently absent than present in this variety, and we can perhaps venture the hypothesis which may be proved or disproved, that as a result of the pericarditis there is a special vulnerability of the serous membranes, and perhaps of its blood-vessels, which causes this enormous leakage of ascitic fluid; and that the morbid processes so started terminate in the exudation denominated as Curschmann's *Zuckergussleber* and analogous conditions in other parts of the abdominal serous membranes; and that when these patients die, as some of them undoubtedly do of tuberculosis, it has been because of lessened local resistance affording an opportunity for the development of the tuberculosis.

In these patients exacerbation comes on very frequently with chill, sug-

gesting infectious pneumonia accompanied by enormously high temperature, and sometimes even with the facies which experienced clinicians will recognize as suggestive, if nothing more, of acute pneumonia. These exacerbations may or may not be followed by ascites. They are uniformly followed by increased adhesions.

In the presence of these conditions the patient demands relief; and, after a great deal of experimentation, it was found that antipyrine salicylate in 10 gr. doses, given every two to four hours, apparently cuts short the exacerbation. Its administration is certainly followed by relief of pain, by falling of the temperature, and the greater comfort of the patient. If any deduction can be made from the use of this remedy and its success in the treatment of this condition, possibly it might be argued that that variety of polyarthritis, which is of rheumatic origin, is similarly found in serous membranes.

It is the hope of the writer that the bringing of this matter to the reader's attention, with perhaps more insistence of the personal element than is warranted, may result in patients being found who present the triad which goes to make up Pick's pseudo-cirrhosis, and also result in the careful analysis of the patients by the application of modern means of investigation, so that questions, which now are left *sub judice,* will be definitely determined.

679 Madison Avenue.

THE INTERPRETATION OF PRECORDIAL PAIN.

By Joseph M. Patton, M. D., of Chicago.

Pain which is located in the precordial region is, as a subjective sign, of considerable importance, inasmuch as it may, on the one hand, be associated with dangerous changes in the heart or great vessels, and, on the other hand, may be indicative only of functional, transitory, and unimportant conditions.

The psychic effect of precordial pain upon most persons is that of alarm or depression. There is, perhaps, no other symptom which in itself does not incapacitate the individual, yet which drives him so quickly to seek advice and relief. This concern, on the part of the patient, is not always proportionate to the intensity or persistence of the pain, for even the *dolor* of angina of organic origin may not be viewed with as much alarm by the patient as is sometimes exhibited because of the presence of reflex precordial pain. The peculiar apprehension of danger which accompanies the pain, due to the former condition, is quite distinct from the nervous alarm occasioned by the latter state; and in the interval of attacks the subject is often less concerned about its causation.

Heart fear is a term used to express a condition in which restlessness, oppression, constriction, or sensations of almost definite pain about the precordium are frequently found in neurotic individuals of all types. It may be connected with derangement of the liver or gastro-intestinal tract, or any organic lesion of the heart muscle, valves, or of the great vessels. It may be accompanied by dyspnea. It is often a prominent feature of nervous disorders of the heart, and it is frequently found in connection with high blood-pressure due to overwork or to nervous strain. It is only mentioned here because of its frequent association with certain types of precordial pain, especially in nervous individuals.

Pain as a subjective evidence of cardiac disturbance has been recognized since the time of Morgagni, and has occupied the attention of clinicians ever since. It is of infinite variety and degree. It may be reflected to almost any portion of the head and trunk, may be bilateral or unilateral, and the painful points are usually tender, as was observed by Laënnec.

To consider the etiology of pain as connected with cardiac conditions in general would take us too far afield, but the interrelation of the cardiac nerves, spinal nerves, brachioplexus, and pneumogastric in this connection has been elaborated by Lussana, Sturge, Ross, Mackenzie, Head, Gaskell, and others. The heart, like other viscera, is not particularly sen-

sitive, but through its central connection with sensitive areas it may, when irritated, be the cause of painful manifestations. Head has said: "The sensory and localizing power of the body is enormously in excess of that of the viscera, and thus, by what might be called an error of judgment, the diffusion area is accepted by consciousness, and the pain is referred to the surface of the body instead of to the organ actually affected."

The fact that the structures of the left portion of the heart are connected with the left coronary and left deep cardiac plexuses, and, along with the superficial plexus, with the left nerve centres, accounts for the greater frequency of left-sided pain in cardiac disease; and the greater pressure-effects in the left heart and aorta, together with the greater frequency of degenerative changes in the coronary vessels of the left heart, furnish a direct etiology for this association.

Cardiac pain from vitiated blood of toxic, degenerative, or anemic origin is generally recognized, and pressure-effects exerted on cardiac nerves from various causes are generally admitted as factors. In the majority of instances, however, organic changes in the heart, in its vessels, or in the aorta are responsible for true cardiac pain. Nothnagel analyzed 483 cases of valvular disease in relation to pain, and found that in aortic lesions of various types pain was present in from 18 to 68 per cent., while mitral lesions showed only from 8 to 18 per cent. in which pain was present.

No one definite explanation suffices for the occurrence of cardiac pain. There are, apparently, many different factors involved in its production, as there have been numerous explanations offered, such as spasm of the heart itself (Heberden, Latham), relative dynamic failure of the muscle (Parry, Brunton), ischemia of the muscle (Burns, Potain), spasm of the coronary vessels (Huchard), hyperesthesia of the cardiac plexus (Romberg), neuritis (Lancereaux, Peter) vasospasm (Landois, Nothnagel); and Balfour has emphasized the importance of functional loss of the nerves involved through malnutrition in exaggerating the effects of the various factors above enumerated.

Certain subjects who are in the earlier period of cardiovascular development which has been styled the prenephritic period, or persons who are suffering from vasomotor inability resulting from mental overstrain but without demonstrable kidney, vascular, or cardiac lesions, but in both instances showing a high blood-pressure, may complain of a sense of constriction, oppression, or pressure about the region of the heart without pain, heart fear, or disturbed rhythm. This is usually a mild intimation of a relative dynamic inability of the heart muscle because of the increased peripheral resistance—resistance which may later develop into a distinct cardiac pain like that which Musser has told us is present in some instances of aortic lesions before the development of relative mitral regurgitation relieves the pressure within the left ventricle. Inasmuch as

these conditions represent the same etiological factors as may later culminate in the production of definite cardiac pain, they are not to be lightly regarded.

In this paper we wish to confine ourselves to pain referred to the precordial area and in which cardiac association comes into question. We thus have to consider myalgia, intercostal neuralgia, pleurisy, pericarditis, reflex gastric pain, gastro-intestinal and hepatic reflexes, pressure pains (new growths, enlarged glands, aneurysms), aortitis, valvular disease, and myocardial disease (especially coronary artery degeneration—true angina). The so-called pseudo-angina, like the angina vasomotoria of Nothnagel, can usually be explained through some of the reflex, toxic, or nervous factors before enumerated.

The interpretation of precordial pain is therefore of interest not only from diagnostic and prognostic standpoints, but also because of the psychic effect of explanations regarding its nature upon the subject. It should be based upon a careful history as to the time and circumstances of the first recognition of the appearance of pain in the precordial region, the general character and frequency of the attacks, the nature of the onset and termination of the individual attacks of pain, the character of the pain, its intensity, duration, point of greatest intensity, transmission or radiation, the known or implied causes for individual attacks, the physical condition of the subject of the attacks, as well as the nature of such measures as have been found necessary or effective for the relief of the pain.

The history of the first appearance of precordial pain may or may not be of a definite nature. There is usually a distinct history of the beginning of the pain due to pleurisy, pericarditis, and the classical type of angina pectoris. Myalgia, intercostal neuralgia, and reflex pain of gastric or abdominal origin usually have an indefinite history as to onset, having not impressed the subject strongly at the beginning except when the pain has set in suddenly as the result of exposure or strain.

Heart pain, due to myocardial conditions, with or without valvular lesions, or from aortitis, usually has an indefinite beginning, as its appearance is, in all these conditions, coincident with the development of a negative quality of cardiac dynamic force. It is, therefore, in the absence of individual strain, insidious in its appearance and may not be recognized by the subject as a factor of importance until its increasing severity limits physical effort.

The general character and frequency of attacks of precordial pain may have diagnostic significance. Pain of cardiac origin is rarely of spontaneous occurrence except in true angina, and even here it is often connected with recognizable cause for the individual attack. Therefore, frequent attacks of pain, or more or less constant pain, will not be likely to be of cardiac origin, especially if unconnected with definite cause. Sudden, severe attacks of pain with subsequent freedom for a consider-

able period are to be regarded with suspicion as probably due to cardiac ischemia which is likely to recur.

The individual attack of pain may show characteristics of onset and termination which are important. Reflex cardiac pain is sudden in onset, intermittent in duration, and the individual pain-sensation ends rather abruptly. Pleurisy pain is sharp and definitely located by the subject. Pericardial pain is usually constant, with exacerbations, and is accompanied by marked excitability of the heart. The pain of myocarditis, dilated heart, or of aortitis as a rule comes on slowly, increases in relation to physical effort, and is relieved by rest. It terminates gradually.

In true angina the onset of the pain is sudden and its termination is abrupt. Its liability to recur is entirely an unknown quantity. The so-called pseudo-anginas are liable to come on somewhat gradually, increase in severity, and end gradually; and the individual attack can probably be associated with some specific cause such as fright, mental strain, or reflex causes.

The character of the pain is of much importance in relation to the interpretation of its probable cause. Reflex pain usually occurs in sharp twinges about the precordial area, extending to the axillary region and beneath the shoulder-blade. Pleural and intercostal pain is sharp, of definite location, intermittent, and is indicated by the patient with the tips of the fingers. Pericardial pain is more or less intense aching, especially about the base of the heart. It is intensified by change of position and shows periodical increase and remission in severity.

Heart pain from increase in intraventricular pressure, beginning asystolism, or aortitis is dull and heavy in character, increased by physical effort, relieved by rest, distressing but rarely intense; and especially in aortitis or dilatation of the ascending arch it may be radiated to the left shoulder and down the left arm.

It is not intended here to discuss the reasonableness of the term pseudo-angina, but in contradistinction to the typical, classical angina vera we may at least admit with Morison that, in so far as the term represents a condition not associated with demonstrable lesion and has a tendency to get well, it may be advisable. Angina *notha* was described by Latham in 1812 in describing a group of symptoms "usually, but not always, denoting angina pectoris." The occurrence of the neurotic forms of angina must be accepted as the reason for such wide difference of opinion in relation to the frequency and fatality of angina pectoris, as appears in medical literature, since the time of Laënnec's observation as to its very frequent occurrence.

Osler divides this type into the neurotic and the toxic; the former into the neurasthenic and hysterical, angina vasomotoria of Nothnagel, and the reflex. The main features of this type are that they occur mostly in married women, in younger persons than true angina, and they tend to get well. Special characteristics are: recurrent attacks, nervous causes, and, at times, remarkable persistency.

The pain of pseudo-angina varies remarkably in character and intensity. It has the widest area of distribution. It may simulate closely the pain of coronary angina both in character and location, but though the patient may be frightened and excessively nervous there is not the distinctive *angor animi* which is so marked a feature of true angina, even of that type described as *angina sine dolore*.

The pain of neurotic angina may come on suddenly, but is likely to be heralded by dizziness, uncertain gait, oppression in the chest in the toxic forms, especially in tobacco angina; by gastric and abdominal symptoms in the reflex form; by faintness, syncopal attacks, flushing or paleness in the vasomotor type; and by weakness, tingling, prickling or numbness of the extremities, dyspnea, and various other nervous manifestations in the nervous and hysterical groups.

The vasomotor type shows, perhaps, the greatest radiation of pain. The point of greatest intensity is usually in the upper portion of the chest and in the arms, but there may be considerable pain in the lower limbs also. There may be severe pain in the neck and back of the head. Pallor, flushing, and sweating are apt to accompany the pain of the vasomotor type of angina.

In the toxic type of angina, especially that due to tobacco, the pain is more dull and distressing than sharp and intense. It is usually limited to the precordial and epigastric regions and may be remittent rather than paroxysmal.

In angina from sclerosis of the aorta, with or without aortic valve lesions, the pain is generally felt at the base of the heart and radiates down the left arm. It is dull and oppressive in character, is increased by exertion, relieved by rest or by lowering the blood-pressure, begins gradually, and ends slowly.

In coronary angina there are two main features of the paroxysm: the *dolor pectoris* and the *angor animi*. These are usually associated, though the latter may obscure the former, which may even be absent—the *angina sine dolore* of Gairdner. A patient of the writer once became much exasperated over this phase of the paroxysm, exclaiming: "I don't understand this. I am not afraid to die. If it must come let it come. I have no pain, and yet I have the most horrible feeling that something is about to happen to me." It did; he died a few minutes later. A well-known physician said, when the writer had responded to his urgent summons: "Doctor, I am comfortable, but I am mighty glad to see you. I am afraid." He was lying on a couch as he said this, and he died almost immediately.

The pain of true angina is indescribable. Patients speak of a feeling as though a dagger were thrust into the heart, of the chest feeling as if crushed in a vise, of a horrible weight pressing the chest wall in, and of a band of iron gradually but slowly constricting the chest. Seneca said: "To have any other malady is to be sick: to have this is to be dying."

The pain begins suddenly and ends abruptly. It may be brought on by excitement, as in the case of the famous John Hunter, who said that "his life was in the hands of any rascal who chose to annoy or tease him." On the other hand, Sumner would precipitate an attack by a sudden movement while reading at night; yet an excitable debate in the Senate had no such effect.

During the paroxysm the subject usually assumes a fixed posture and remains so until the attack has passed off, being apprehensive of the effect of the slightest movement. Hunter's nephew says that during the first attack suffered by his uncle, the latter "found himself not breathing. Being afraid of death soon taking place if he did not breathe, he produced the voluntary act of breathing by working his lungs by the power of his will." In many instances the statue-like immobility, together with the very evident suffering and anxiety, forms a marked contrast with the restless irritability of other forms of angina.

The location of the pain in coronary angina is not confined to the precordial area, though as a rule it has not the same wide radiation of the other forms of angina. Substernal pain—sternalgia—is very frequent in true angina as in all forms of stenocardia. Its point of greatest intensity may be anywhere from the manubrium to the xyphoid cartilage, and its area may be such as to bring the stomach or liver into question as to the cause of the pain.

A very vigorous physician of seventy years of age developed attacks of pain in the epigastric region. Their character and effect were typically that of angina. He insisted that the pain was not felt above the end of the sternum. He died following a severe attack of pain, and autopsy determined a localized area of myomalacia cordis about the size of a silver half-dollar involving the anterior wall of the left ventricle. This softened area had ruptured, and a quantity of blood had leaked into the pericardial sac.

There can be no question but that the most frequent seat of pain in coronary angina is along the sternum, especially the left edge or parasternal line, and over the precordium. It may or may not radiate, but if it does the arms may suffer most, particularly the left, including even the forearm and fingers.

The known or implied factors in the production of attacks are important in relation to diagnosis. When the attack is precipitated by gastric, hepatic, or intestinal disturbances the affair is likely to be reflex in origin, although true coronary angina may be brought on by such causes. Tobacco and other toxic causes may give some intimation of the nature of an attack. Physical effort as a cause is generally associated with coronary angina or with pressure changes in the aorta. The more distinctly the attack appears to be without assignable cause, the more surely it is of coronary type.

The general physical condition of the subject must be considered. Heredity, we know, plays a part in individual liability to anginous con-

ditions to the extent of furnishing physical types tending toward arterial degeneration. The celebrated English family, Arnold, has been cited in this connection, and there are many other instances.

Angina pertains to an easy, sedentary life rather than to work and temperance in all things. Mental overwork and the strenuous life has its etiological relationship. It is true of angina, as Sydenham said of gout, that its victims include more wise men than fools.

Because of the character of the etiological factors men are much more affected with angina than women. Huchard's statistics included 237 cases of true angina, of which only 42 were women.

Likewise age is an important factor, the majority of cases occurring after the fiftieth year of life. Young persons or even children may be affected with that form of angina which belongs to valvular or pericardial lesions, and young adults may exhibit toxic, nervous, or reflex forms. Mental worry, grief, or shock may precipitate attacks of all forms of angina.

Among the constitutional diseases likely to show anginous attacks during their course are gout, diabetes, syphilis, and locomotor ataxia. Certain specific fevers and influenza, among the infections, may also produce attacks of angina.

The heart lesions which most commonly exhibit heart pain are myocarditis, aortic lesions (especially aortic regurgitation), aortitis, aneurysm of the arch of the aorta, adherent pericardium, and, rarely, mitral lesions. Vagrant precordial pains are not infrequent in mitral stenosis, particularly in nervous women, but typical angina is very rare. Nothnagel collected 1,500 cases of valvular disease, in many of which there were anginous symptoms, but in only one instance was the angina associated with mitral stenosis.

The majority of persons suffering from angina show evidence of arteriosclerosis, more or less accentuation of the second aortic sound, some enlargement of the heart, and high blood-pressure. In some instances, however, physical signs will be absent or very indefinite, and these cases should be regarded with suspicion.

The effective means of relieving the attack may give us some intimation of the nature of the angina. When relief is afforded only by rest, vasodilators and opiates, it is likely that a true angina is present. If nervines, relief of gastric or abdominal disturbances, eliminatives, or restriction of alcohol, tobacco, or drugs give relief, then it is likely that we have to deal with nervous, reflex, or toxic forms of the affection.

The longer one's experience with angina, the more fixed becomes the realization that a correct interpretation of its import is at times extremely difficult, that dogmatic assertions are evidence of ignorance or inexperience, and that an optimistic attitude, on the part of the medical advisor in his direct relations with the patient, is advisable because of its beneficial psychological effect.

108 N. State Street.

MEDICAL AND SURGICAL PROGRESS.

BRILL'S DISEASE.

A REVIEW OF RECENT LITERATURE.

By S. STROUSE, M. D., of the Editorial Staff.

1. Brill: An Acute Infectious Disease of Unknown Origin. A Clinical Study Based on 221 Cases. (*Amer. Journ. Med. Sciences*, Vol. CXXXIX, p. 484, 1910.)
2. Brill: Pathological and Experimental Data Derived from a Further Study of an Acute Infectious Disease of Unknown Origin. (*Amer. Journ. Med. Sciences*, CXLII, p. 196, 1911.)
3. Louria: Brill's Disease. (*Med. Record*, Vol. LXXX, p. 424, 1911.)
4. Friedman: Brill's Symptom-Complex; Typhus Fever; Manchurian Typhus. (*Arch. Int. Med.*, Vol. VIII, p. 427, 1911.)
5. Cheinisse: La "Maladie de Brill," est elle une Entité Morbide Nouvelle? (*Semaine Médicale*, Vol. XXXII, March 27th, 1912.)
6. Brill (*Journ. Amer. Med. Assoc.*, Vol. LVII, p. 1854, 1911).
7. Anderson and Goldberger: The Relation of So-Called Brill's Disease to Typhus Fever. (*Public Health Reports*, Vol. XXVII, February 2nd, 1912.)
8. Anderson and Goldberger: The Experimental Proof of the Identity of Brill's Disease and Typhus Fever. (*New York Medical Journal*, Vol. XCV, p. 976, 1912.)
9. Goldberger and Anderson: The Transmission of Typhus Fever, with Especial Reference to Transmission by the Head Louse (Pediculus Capitis). (*Public Health Reports*, Vol. XXVII, p. 297, 1912.)
10. Brill: The Identity of Typhus Fever and Brill's Disease. (*Med. Record*, Vol. LXXXI, p. 1037, 1912.)

To Dr. N. E. Brill, of New York, belongs the great credit of having isolated, from the mass of confusing fevers seen in a large general hospital, a group with uniform and definite findings. This group had been studied by Brill for many years before he felt justified in describing the disease as an undoubted clinical entity; and, in the literature which followed the publication of his articles, the disease became known by his name. As there still seems to be some discussion as to the nature of the malady, we shall keep the name "Brill's disease."

The definition of the disease is quoted verbatim from Brill's report: "An acute infectious disease of unknown origin and unknown pathology.

characterized by a short incubation period (four to five days), a period of continuous fever, accompanied by intense headache, apathy and prostration, a profuse and extensive erythematous maculo-papular eruption, all of about two weeks' duration, whereupon the fever abruptly ceases either by crisis within a few hours, or by rapid lysis within three days, when all symptoms disappear."

Headache is intense, conjunctivæ are congested. About the sixth day a characteristic rash appears. At first found over the abdomen and back, it quickly spreads to the thorax and to the arms and thighs, and occasionally to the neck, forearms, hands, legs and feet. The rash is dull red, very slightly raised, does not disappear on pressure, does not appear in crops, is profuse and is distinctly erythematous. The pulse is not high—86 to 100 per minute, is soft, full, of low tension and often dicrotic. The temperature reaches its fastigium on the second or third day, remains constantly high till just before the crisis, when a precritical rise may occur. Constipation is a marked feature of the disease. The spleen is frequently, but not always, enlarged. Associated with intense headache are extreme apathy and a facial expression of great pain. On the twelfth to the fourteenth day the symptoms disappear, the temperature drops, and the patient feels perfectly well.

The average blood count is from 9,000 to 11,000; the average differential count showed 69.4 per cent. polymorphonuclears, and 30.6 lymphocytes. As for the Widal reaction, in not a single case was a positive reaction ever obtained, even though the test was done daily in most of the cases. Blood cultures were persistently negative, and attempts to isolate a specific micro-organism from feces and urine were also unsuccessful.

In a second report one autopsy is recorded. This showed absolutely none of the characteristic lesions of typhoid fever, and gave no specific picture. The lesions found were the congestion and parenchymatous changes of a severe toxemia.

The clinical similarities between Brill's disease and typhus fever are so striking that Brill says: "In the case of an epidemic of typhus fever, in my opinion, it would be simply impossible to say that these cases were not mild typhus fever. From the clinical aspects no lines of demarcation can be fixed." However, this disease was not virulent, was constantly present in New York, was not communicable; and, until typhus fever was shown to have been so changed by its environment as to have acquired these characteristics, Brill was decidedly of the opinion that his disease must be other than typhus.

About one year later Louria reported 18 cases of the disease from Brooklyn, and his conception of the disease is that it is merely attenuated typhus. Friedman, in the same year, in a critical clinical review of endemic and sporadic cases of typhus in Russia, concludes that these cases and Brill's are absolutely identical, and Cheinisse holds the same opinion regarding some cases he saw in France. Brill, however, in a subsequent note again states that he does not think his disease is typhus fever. The writer of this review has seen cases in Chicago and is of the opinion that they are typhus fever.

Thus the matter rested on purely clinical grounds until Anderson and Goldberger applied experimental methods to the study. Struck by the clinical similarities between Mexican typhus, which they were investigating, and the disease described by Brill, they attempted monkey inoculations with blood of patients suffering from Brill's disease. Brill had

already made unsuccessful efforts to transfer the disease to monkeys, but Anderson and Goldberger succeeded in their attempts. In monkeys successfully inoculated, after an incubation period of five to fourteen days, a rapid rise of temperature ensued, falling by rapid lysis or crisis after about nine days. An eruption was never seen. The disease thus produced in monkeys by inoculating the blood of a human could be transferred from monkey to monkey, and in one case it has been carried through fifteen generations. Having shown that the Rhesus monkey is susceptible to Brill's disease, Anderson and Goldberger next attempted to study the relationship between this disease and Mexican typhus. In a most striking series of perfectly controlled experiments they demonstrated that monkeys, which had recovered from an inoculation with blood of Brill's disease, were immune to subsequent infection with Mexican typhus, and, vice versa, monkeys which had recovered from Mexican typhus were immune to Brill's disease. They conclude that "the disease described by Brill is identical with the typhus fever of Mexico, and inasmuch as the New York strain is undoubtedly of European origin, we may also conclude that the typhus of Europe and the tabardillo of Mexico are identical."

Later Brill reviews the work of these two men and considers their conclusions too far-reaching. He argues that while Anderson and Goldberger have shown that Brill's disease and typhus fever are related, they have not proved their identity. In support of this contention reference is made to recent work at the Pasteur Institute by Metchnikoff and Besredka showing that chimpanzees immunized against paratyphoid are immune to typhoid. Everyone knows that whereas these two diseases are closely related clinically and etiologically, they are not identical. Furthermore, the well-known reaction of immunity against variola by inoculation of vaccinia virus is evidence that the production of immunity to one disease by another is not proof of their identity. Brill's opinion then is that the disease described by him is very closely related to typhus fever, but that proof of their identity is still lacking.

The mode of transmission of the disease was studied by Anderson and Goldberger in connection with their similar investigations of typhus fever. They showed that both body lice and head lice are capable of transmitting the infection, but their work does not prove that this is the only possible method.

Whether the disease be mild typhus fever or a new clinical entity similar to typhus remains to be demonstrated. But its close relationship to typhus makes it imperative for the medical profession to be on the lookout for the disease and for Boards of Health to demand that it be reported.

THE EARLY DIAGNOSIS OF TUBERCULOSIS.

By Albert E. Taussig, M. D., of the Editorial Staff.

1. Bardeleben: Genital and Pulmonary Tuberculosis in Women. (*Tuberculosis,* No. 3, 1912.)
2. Harris: A Diagnostic Tender Spot in Pulmonary Tuberculosis. (*Journ. Amer. Med. Assoc.,* No. 23, 1912.)
3. Koplik: Tuberculosis in Infancy and Childhood. (*Bulletin Johns Hopkins Hospital,* No. 4, 1912.)
4. Pottenger: Muscle Spasm and Degeneration. (*Beitr. zur Klinik d. Tuberk.,* No. 1, 1912.)
5. Rœpke: Tuberculosis Diagnosis. (*Deutsch. med. Wochenschr.,* Nos. 41, 42, 51, 52, 1911; Nos. 12, 13, 1912.)
6. Schloessmann: Primary Mesenteric Tuberculosis. (*Beitr. zur klin. Chir.,* No. 2, 1912.)
7. Sluka: Hilus Tuberculosis. (*Wien. klin. Wochenschr.,* No. 7, 1912.)
8. Stiller: Thorax Phthisicus. (*Tuberculosis,* No. 1, 1912.)

While the diagnosis of advanced tuberculosis is one of the commonplaces of internal medicine, this is by no means true of the diagnosis of this disease in its incipiency. Few things are more difficult and yet more indispensable to the patient's welfare than its early recognition. The general principles, upon which the early diagnosis of tuberculosis is based, have been well established for some time. In matters of detail, however, there have recently been many important contributions in medical literature, so that a brief résumé of modern methods in this field may be worth while. It will be best to consider the tuberculous infection of each organ separately.

Lungs.

An indispensable prerequisite for the early diagnosis of pulmonary tuberculosis is a careful anamnesis. This should include an inherited disposition, early predisposing ailments, habits and the like. Among the earliest subjective symptoms are a little fever, unexplained loss of weight, dyspeptic symptoms, a tendency to cough early in the morning or after severe exertion, pain about the chest usually considered "rheumatic," a slight dyspnea on going upstairs and finally pulmonary hemorrhage. Among working people, the last is an initial symptom in nearly half the cases.

Inspection is a method of physical diagnosis far too frequently neglected. It can be adequately carried out only if the patient is completely stripped to the waist. This is often objected to by women, but not nearly as often as one might suppose. If a woman suspects herself of being tu-

berculous, she is usually willing to submit to any sort of examination calculated to throw light upon her condition. Such an inspection not only gives valuable information about the degree of emaciation and the structure of the thorax, but, above all, makes possible the recognition of a beginning asymmetry. A depression in one supraclavicular fossa, circumscribed flattened areas in the anterior wall of the thorax together with retarded respiratory movements in these areas, comparative immobility of the first rib and clavicle on one side during inspiration, are all important early signs. The presence of dilated cutaneous veins over one apex, changes about one nipple, differences in the diameters of the pupils, are less valuable for diagnostic purposes.

Attention has been called to the value of palpation by the work of Pottenger. He has shown that a spastic condition of the muscles over one apex may be the earliest sign of a pulmonary tuberculosis. The recognition of this phenomenon requires some practice but is often of great diagnostic importance. It is best made out by extremely gentle palpation. Harris believes that the occurrence of a localized tender spot just above the tip of the superior angle of the scapula is suggestive of apical tuberculosis.

A careful percussion of the entire thorax is, of course, essential. Special value attaches, however, to very light percussion of the apices during extreme inspiration. Slight abnormalities can thus be detected that might otherwise be overlooked. Kroenig's method of determining the width of pulmonary resonance on the shoulder deserves particular mention. Percussion should be done, almost inaudibly, finger upon finger, with the ear held close to the plessimeter finger, beginning at the middle of the shoulder and proceeding towards the neck and towards the shoulder-joint. Normally, a band of resonance can thus be made out extending from the supraclavicular fossa, across the shoulder, to the back. If this band is narrower on one side than on the other, or if it is interrupted by an area of flatness, the presence of tuberculosis can be assumed with a considerable degree of certainty. The method does not, however, enable us to distinguish between a healed and an active tuberculosis, since a shrunken apex will behave in this respect like an infiltrated one. Auscultation is required to differentiate between these conditions.

The utilization of the results of auscultation in the very beginning of pulmonary tuberculosis is a matter of considerable difficulty. A very weak respiratory murmur over one apex is perhaps the earliest change. Later this is replaced by a blowing inspiratory sound followed by a rather loud and prolonged expiratory murmur. The significance of the cogwheel respiration is disputed; at any rate, it must be carefully distinguished from a very similar interrupted respiratory murmur due to cardiac systole. If râles are present and localized over one apex, the diagnosis becomes much more certain. Such râles can often be elicited after coughing, when they cannot otherwise be heard. Pulmonary auscultation in suspected tuberculosis, without making the patient cough, involves a grave oversight.

The increase of bronchophony, as usually practised, can hardly be considered an early sign. Sewall has shown, however, that the pulmonary resonance, produced by making the patient whisper, can be so utilized. The whispered voice will then be heard, either altered in quality or increased in loudness, over the affected area.

The finding of tubercle bacilli in the sputum, of course, settles the diagnosis. Such a sputum is, however, an evidence, not of a beginning

tuberculosis, but of one that has become ulcerative. Occasionally, a very few bacilli will be expectorated early in the disease, but so scantily that they are usually overlooked. Hence, the importance of concentrating the bacillary content of the sputum. The best of these procedures for the practitioner is Schulte's modification of Uhlenhut's antiformin method. To 10 c.cm. sputum, add 20 c.cm. of a 50 per cent. antiformin solution; shake well. In ten to thirty minutes, during which time the mixture is occasionally shaken, a homogeneous fluid results. Add 30 c.cm. alcohol, shake, centrifugate, pour off the clear supernatant fluid and stain the sediment according to the usual methods. Tubercle bacilli may then be found when they could otherwise hardly be detected. Another advance in the bacteriology of tuberculous sputum consists in the detection of the granular form of the tubercle bacillus with Much's modification of the Gram stain. Rœpke has shown that, in about 12 per cent. of all cases, these granules are the only form of the bacillus present. The method is, however, somewhat difficult and hardly suitable for the general practitioner. The tendency to exclude pulmonary tuberculosis, whenever the sputum contains no tubercle bacilli, is to be deprecated. In fully nine-tenths of all cases of early pulmonary tuberculosis, the sputum examination will be negative. For this reason too the injection of the sputum into guinea-pigs is not worth while.

The x-rays are of undoubted value in many thoracic lesions and often serve to localize accurately more advanced tuberculous infiltrations. Their usefulness for the early diagnosis of pulmonary tuberculosis is doubtful. The changes then are so slight as hardly to admit of correct interpretation on the x-ray plate, not to speak of the possibility of misinterpreting small accidental spots, such as those produced by a gland or by the crossing of an artery over a bronchus, for tuberculous lesions. Certainly the correct interpretation of such a plate requires unusual skill and experience, such as will hardly ever be at the disposal of the ordinary radiographer.

A word regarding the tuberculin tests. The conjunctival test has been abandoned by nearly all clinicians, being uncertain and not free from danger. The cutaneous test has little value in the adult: a positive reaction signifies nothing, a negative one merely makes the presence of tuberculosis less probable. In young children, however, the test is of the greatest value, and comes as near being pathognomonic as any method in medicine. The hypodermic tuberculin test, on the other hand, when properly interpreted is of definite value in the adult. A positive reaction has three characteristics: a local reaction, consisting of redness and induration at the site of injection; a constitutional reaction, consisting of fever and malaise; a focal reaction, consisting of pleuritic pain, increased cough and expectoration, and above all of an increase of the physical signs (râles, impaired resonance, abnormal respiratory murmur) over the affected area. The local and constitutional reactions must be interpreted cautiously in the adult. The focal reaction, on the other hand, not only demonstrates the presence of a tuberculous lesion, but often gives valuable information as to its site. If it is produced by a dose smaller than 5 mm. of tuberculin, the presence of an active tuberculous focus may be concluded; doses of 5 or 10 mm. may produce a reaction even in an inactive focus. A negative reaction speaks against the presence of a pulmonary tuberculosis but not absolutely so. It may be well to add that, when properly done, the test is absolutely free from danger in this condition.

PLEURA.

There is still a radical difference of opinion as to what proportion of all pleurisies is tuberculous. The estimates range from 2.8 to 98 per cent., the true figure being perhaps 50 per cent. (Stintzing). There can, however, be no question that pleurisy is a frequent complication of tuberculosis and usually of pulmonary tuberculosis. The physical signs of dry tuberculous pleurisy are adequately described in the textbooks and need not be discussed here. When they are poorly marked, the possiblity of an intercostal neuralgia must be considered. Then it may be well to remember that, in the latter condition, the pain is aggravated by bending the body towards the affected side, while in dry pleurisy the pain becomes more severe on bending the body towards the well side. In obscure cases the hypodermic tuberculin test may throw light on the condition. Here, too, it is the focal reaction that is decisive, leading not only to an increase of the pain and of the physical signs, but usually also uncovering the site of the pulmonary tuberculosis, which till then may have remained hidden.

In pleurisy with effusion, usually also tuberculous, we have the physical signs of fluid in the chest. These are usually unmistakable in the adult, but are often ambiguous in children. The tuberculin test is of no avail in these cases, since a focal reaction will be concealed by the fluid; the x-rays, on the other hand, are of great service. To determine the nature of the exudate, some of the fluid must be aspirated and examined. A specific gravity of 1015 speaks for the presence of a transudate rather than of an inflammatory fluid. If the exudate is purely serous, the tubercle bacilli can practically never be found, either microscopically or by means of animal experiment. In serofibrinous exudates, the bacilli can usually be demonstrated, especially if the clot be dissolved by antiformin and treated in the manner before described. Finally the cytodiagnosis of Widal may prove useful. A little of the fluid is centrifugated, immediately after aspiration, spread on a slide and stained with methylene-blue. If 50 per cent. or more of all cells found are lymphocytes, the fluid is probably tuberculous.

Of the atypical forms of tuberculous pleurisy, the most important are diaphragmatic and interlobar exudative pleurisies. The former is characterized by severe subjective disturbance, consisting of pain low down the thorax, painful vomiting and dysphagia, with scanty objective findings. The condition may suggest an abdominal lesion. Two painful areas characterize the affection, one in the epigastrium corresponding to a point at the intersection of the sternal line with the prolongation of the tenth rib, the other in the side of the neck, corresponding to the course of the vagus nerve. In interlobar pleurisy, acute pleuritic symptoms arise, at first without objective signs, later with the appearance of a transverse band of dullness corresponding to an interlobar line. Radioscopy is here of particular diagnostic value. The exudate is often purulent and may perforate into a bronchus.

Pneumothorax is occasionally an early occurrence in pulmonary tuberculosis. Its diagnosis, while sometimes difficult, need not be discussed here. The differentiation between it and a diaphragmatic hernia can most readily be made by means of the x-ray.

Larynx.

While laryngeal tuberculosis, in the great majority of cases, is secondary to a relatively advanced and ulcerative pulmonary tuberculosis, its early diagnosis is none the less important, if only for the reason that early cases respond far more readily to treatment than advanced ones. Unfortunately, the larynx is usually not examined until after subjective laryngeal symptoms, such as hoarseness, localized discomfort, and coughing after speaking call attention to the organ. These are, however, symptoms that arise only when the process is well advanced. An earlier manifestation is a slight tendency of the larynx to tire after moderate use and a slight huskiness of the voice early in the morning or after long periods of silence. Ordinarily, however, a genuinely early tuberculous laryngitis produces no symptoms whatever and will usually be recognized only by the physician who uses the laryngoscope in every case of manifest or suspected pulmonary tuberculosis. The interpretation of the laryngoscopic picture is not always easy. It needs especially to be distinguished from acute or chronic catarrhal laryngitis, neoplasms and syphilis. The presence of a simultaneous pulmonary tuberculosis is suggestive but not conclusive. In doubtful cases, the result of local treatment will differentiate it from ordinary laryngitis and of antisyphilitic treatment from a luetic affair. A laryngoscopic examination before and after a hypodermic tuberculin injection is especially conclusive. An increased reddening and swelling, after as compared with before the injection, represents a focal reaction and is practically conclusive as to the presence of a tuberculous laryngitis.

Digestive Tract.

Buccal tuberculosis is rather readily recognized. Tuberculosis of the esophagus, stomach, pancreas and liver is fortunately as rare as it is difficult to diagnose. For esophageal tuberculosis, the use of the esophagoscope represents an important diagnostic measure.

Intestinal tuberculosis is primary only in children. Its diagnosis is easy, if intestinal symptoms combine with a positive cutaneous tuberculin reaction. In adults it is nearly always secondary to a pulmonary tuberculosis, for which reason the finding of the bacilli in the stool is of little importance, since their source may well be the swallowed sputum. Out of 567 cases of intestinal tuberculosis, Bollinger found only 3 without a simultaneous involvement of the lungs. Its signs and symptoms are those of an ulcerative enteritis, the nature of which is made clear by the presence of a tuberculosis of the respiratory tract. Its differentiation from chronic perityphlitis, carcinoma, etc. may be difficult, but is hardly concerned with the matter of early diagnosis.

Peritoneum.

Tuberculous peritonitis may be primary, but is more usually secondary to pulmonary, intestinal or glandular tuberculosis. Its most important forms are the chronic dry adhesive and the exudative type. The former may at first cause few and obscure symptoms. Sooner or later the intestinal coils and the other abdominal viscera become agglutinated, resulting in false tumors and evidence of intestinal obstruction. An early

diagnosis is possible chiefly by means of the hypodermic tuberculin test. Here again it is chiefly the focal reaction that is important, manifesting itself in abdominal pain and a feeling of distension, in eructations, vomiting and profuse diarrhea.

The exudative form is characterized by the production of a more or less profuse ascites that may be serous, sero-fibrinous, more rarely hemorrhagic or purulent. The signs and symptoms are in general those of any chronic peritonitis. If the fluid is scanty, agglutinated masses may be felt which must be differentiated from other tumors—syphilitic, carcinomatous and cystic. As a free ascites may be due to cardiac, renal or hepatic disease, not to speak of uterine fibroids or peritoneal carcinoma, it is necessary to establish the tuberculous nature of the exudate. This may sometimes be done by means of tapping. Tubercle bacilli may sometimes be found microscopically, more constantly by means of injection into guinea-pigs. In the latter case, however, the long wait before the animal experiment can be concluded is a disadvantage. An exploratory laparotomy always settles the diagnosis. This procedure is indicated the more because the therapeutic results are often satisfactory. The tuberculin test is less useful in this condition than in the dry form, but may become important where the diagnosis lies only between peritoneal carcinosis and tuberculosis.

Male Genitalia.

Tuberculosis of the male genitalia affects chiefly the prostate and the scrotal contents. It occurs chiefly during the period of active sexual life and is often secondary to a gonorrheal infection. Prostatic tuberculosis produces a symptom-complex closely resembling that of gonorrheal prostatitis, from which it may usually be distinguished by the demonstration of tubercle bacilli in the secretion and, still more certainly, by means of the urethroscope. The prostate can be felt to be enlarged early in the disease.

Tuberculosis of the scrotal contents nearly always begins in the epididymis, soon involving the seminal duct with the production of a rosary-like series of indurations. The testes are involved late or not at all. The characteristic of these masses, if tuberculous, is the absence of tenderness and their nodular surface. In a doubtful case, the hypodermic tuberculin test, with the production of a marked reaction at the site of disease, will settle the diagnosis.

Female Genitalia.

Any portion of the female genitalia, from vulva to ovary, may become tuberculous, but in the great majority of cases, in nearly 85 per cent. according to Kroemer, the tubes are involved. The presence of bilateral tubal tumors, a little fever, together with the combination of greatly increased abdominal pain after exertion and relative lack of local tenderness on palpation, are very suggestive of tubal tuberculosis. If the pelvic peritoneum is involved, the tuberculous nodules can sometimes be felt in the cul-de-sac. The diagnosis may, however, be very difficult, as shown by the observation that clinically barely 4 per cent. of all cases of tuberculosis in women are made out to involve the genitalia, whereas, at autopsy, 18 to 30 per cent. are so reported. Emaciation and pallor are not at all invariably present; genital tuberculosis in women is consist-

ent with an absolutely healthy appearance. It may require an exploratory operation to settle the diagnosis.

There has been some difference of opinion as to the value of the tuberculin test in these cases. The cutaneous and conjunctival tests are clearly valueless, and some gynecologists are inclined also to discard the hypodermic method. Others, like Birnbaum, Krœmer, and Rœpke, insist that a positive focal reaction demonstrates the presence of a genital tuberculosis, whereas an absence of both general and focal reactions makes the absence of a genital tuberculosis nearly certain. The indecisive results of some observers are probably due to a faulty technique.

Bones and Joints.

Tuberculosis of the bones and joints is, in 80 per cent. of all cases, secondary to tuberculosis elsewhere. The remaining 20 per cent., in which the process is primary, are found almost exclusively in children, especially in the first ten years of life. For the clinical diagnosis the reader must be referred to special treatises. Suffice it to say that the most useful single diagnostic method in these conditions is the study of the radiographic plate, which rarely fails to settle the diagnosis. The tuberculin test may be useful if tuberculosis has not been found elsewhere. Since, however, the reactions to tuberculin injections are often especially violent in these conditions, it is not always advisable to utilize them, although when used their testimony is usually decisive. It is hardly necessary to point out the extreme importance of an early diagnosis of these conditions, especially in children.

Skin.

A great variety of tuberculous skin affections has been described, the majority of which interest chiefly the dermatologist. The most important of them, for the general practitioner, is lupus vulgaris, which doubtless occurs more frequently than is generally supposed. Its beginning usually extends back to early childhood, rarely, if ever, occurring in later years. It is most common among the dwellers in crowded slums. Its chief localization is the face; especially about the nares, the mucous membrane of which is almost always involved. It begins as a small conglomeration of tuberculous nodules resulting in a small brownish spot of soft consistency, which stands out more distinctly if the surrounding skin is rendered anemic by pressure with a glass slide. Its further progress is characterized by a peripheral growth with central scar production, the margin of the patch remaining soft, not infiltrated, and bleeding readily. In children it is confined for some time to the nasal outlet with the production of painless scabs and the picture of a dry coryza. In this condition, more than in any other, the hypodermic tuberculin test is useful and should never be omitted. Even a small dose will be followed in four to six hours by an evident focal reaction, consisting in hyperemia and swelling confined to the site of eruption. This positively settles the diagnosis.

Eye.

We have come rather recently to recognize that tuberculosis of the eye, instead of being a rare, is a common, affliction. Any one of the ocular

tissues, conjunctiva, cornea, sclera, iris and ciliary body, choroid, the lens. optic nerve and tear-duct may be the seat of a tuberculous infection. While occasionally secondary to tuberculosis elsewhere, tuberculosis of the eye is more often a primary affair, not infrequently following a trifling trauma. Clinically, its certain diagnosis is a matter of great difficulty or even an impossibility. A non-tuberculous conjunctivitis or iritis may closely simulate the tuberculous form, while corneal or scleral lesions often turn out to be tuberculous when nothing in their appearance suggests this etiology. It is simply impossible to diagnose a large percentage of these eye conditions without the use of tuberculin. The cutaneous tuberculin test is of comparatively little value, while the conjunctival test is directly contraindicated. The hypodermic test, on the other hand, if properly done usually clears up the diagnosis, and here again chiefly by means of the focal reaction. In order to avoid strong reactions, it is well to use small doses, beginning with one-tenth of a milligram of old tuberculin and not exceeding three milligrams as a final dose. The important point is to recognize a moderate reaction, consisting in a slight increase of the injection and tumefaction. If this first reaction is overlooked, a further increase of the dose may result in a violent reaction. Experience shows that the latter rarely or never causes permanent damage, but it is unpleasant and unnecessary and should be avoided. For this reason the test should be done by an expert ophthalmologist or at least under his supervision.

Ear.

Tuberculosis of the ear is most frequent during childhood. That of the tubes is usually secondary, runs an insidious course, and in its early stages can hardly be diagnosed. Mastoid tuberculosis also runs an insidious course, often producing no symptoms until a sequestrum is formed. Even where the clinical picture is that of an acute mastoiditis, it may be nearly impossible to distinguish between the tuberculous and the pyogenic form. Ordinarily the diagnosis is cleared up only at the time of operation.

Middle-ear tuberculosis is usually secondary to tuberculosis of the respiratory tract. It too may run a very insidious course, with few subjective symptoms or it may run a very acute course with rapid bone destruction. In neither case can the diagnosis be made, as a rule, until after perforation of the drum membrane occurs. Multiple perforations, situated in the anterior and posterior lower quadrants, speak rather for a tuberculous than for a purulent otitis media. The interpretation of the changes within the middle ear itself must be left to the specialist in ear diseases. A facial paralysis is more apt to accompany tuberculous than non-tuberculous otitis media. The tuberculin test is of little value in ear affections on account of the difficulty of recognizing a focal reaction.

The examination of the secretion from the middle ear, on the other hand, is important. The meatus is thoroughly cleaned and closed with a little absorbent cotton. The next day the ear is washed out, the secretion picked out of the wash water, spread out on a slide, stained with carbol fuchsin and decolorized for twenty-four hours in alcohol containing 3 per cent. hydrochloric acid, in order to exclude pseudo-tubercle bacilli. Occasionally animal inoculation may be of service. If no tubercle bacilli are found, the prevalence in the secretion of large lymphocytes is suggestive of tuberculosis. They may be demonstrated by staining a spread of

the exudate with Loeffler's methylene-blue. In pyogenic otitis, the pus will be found to consist nearly exclusively of polynuclear cells.

MENINGES.

Tuberculous meningitis is nearly always secondary to tuberculosis elsewhere, most frequently in the lungs. It occurs eight times as frequently in children as in adults, but may set in at any age. Its early recognition is as difficult as its diagnosis in the later stages is easy. In children it ordinarily begins with emotional disturbances. The children become moody, irritable and show a desire to be let alone. The appearance of violent cerebral vomiting soon suggests meningitis, especially if accompanied by constipation. In the second week, temperature, pulse, and respiration fall together and sooner or later a general paralysis sets in.

The tuberculin tests are of no use in this condition, the hypodermic test being directly contraindicated. The best means for an early diagnosis is lumbar puncture. A clear fluid issues through the needle, often under considerable pressure. If this fluid is set aside for twenty-four hours in the ice-chest, a delicate clot like a spider-web separates out and may be spread on a slide and stained. The tubercle bacilli and cells of the entire exudate become entangled and concentrated in this clot. The former can usually be demonstrated and settle the diagnosis, while a marked lymphocytosis among the cellular elements speaks strongly, though not absolutely, for a tuberculous meningitis.

The presence of tubercles in the choroid is usually mentioned in the textbooks as an important feature of tuberculous meningitis. They are, however, rarely found unless the meningitis is a part of a general miliary tuberculosis. Certainly, their absence cannot be said to have any diagnostic significance.

MILIARY TUBERCULOSIS.

General miliary tuberculosis is nearly always a secondary phenomenon, being brought about by the sudden irruption of masses of tubercle bacilli into the blood-stream from some active focus. This may, however, be an unrecognized glandular infection, in which case the miliary tuberculosis assumes the appearance of a primary illness. Its symptomatology is not definitely characteristic; in general, it may be divided into the typhoid, the pulmonic and the meningeal forms.

The typhoid type results from a general intoxication and usually consists of a rather irregular but high fever, rapid pulse, low blood-pressure and great prostration. The spleen is often enlarged. If any illness, suggestive of typhoid fever, with positive diagnosis but negative Widal reaction, the possibility of a miliary tuberculosis must be kept in mind.

The meningeal form produces the same picture as tuberculous meningitis, except that choroid tubercles are far more constantly found. They are usually present in considerable numbers, and, on ophthalmoscopic examination, can be made out as pale, yellowish or grayish spots, round or elongated, with indistinct margins.

The pulmonic type is characterized by a violent cough, usually dry, with rapid respiration, dyspnea and often cyanosis, while physical examination of the thorax results in vague and insufficient findings, suggesting merely a general catarrhal condition. Later, edema of the extremities and pleuritic or pericardial exudates, often hemorrhagic in nature,

may appear. The x-rays are of great value in this condition. A plate, taken while the patient holds his breath, shows a characteristic diffuse mottling that has been aptly compared to the eruption in measles (Sewall).

The tuberculin test is of little avail in this condition. The tubercle bacilli may, however, often be demonstrated in the venous blood. For this purpose, Rœpke recommends Kurashige's method: 1 c.cm. of blood obtained by venepuncture, is dropped into 5 c.cm. 3 per cent. acetic acid, the mixture being shaken carefully to avoid the production of froth. After standing one-half to one hour, it is centrifugated. To the sediment, add 5 c.cm. antiformin, stir until complete solution has taken place and centrifugate again. The sediment is washed with distilled water, centrifugated, spread, fixed and stained in the usual manner, decolorized very briefly and washed very gently. Special care must be taken that the distilled water itself does not contain acid-fast bacilli (Brem).

Children.

The tuberculosis of childhood differs in many respects from that of adult years. The infection may be either aerogenic or enterogenic and may be due either to the bovine or the human bacilli. In the great majority of cases, however, children are infected by the entry into their digestive tract of tubercle bacilli of the human type. The usual source of contagion for them, then, is a consumptive human being; exposure of this sort, when brought out by a careful anamnesis, often helps to clear up the diagnosis.

Since the tuberculous infection in children spreads by means of the lymphatics, its course to a great extent depends upon the power of resistance of the lymphatic system. In general, this is low;—whence the frequent occurrence of acute phthisis in infancy and the prevalence of miliary tuberculosis and that involving the meninges, bones and joints in later childhood. The acute forms are usually not diagnosed until the condition is well advanced and in these forms the tuberculin tests are of no utility. In the more chronic forms, however, tuberculin diagnosis is of great importance, the cutaneous test serving well in young children while the hypodermic test is more useful in older ones.

One of the commonest types of tuberculosis in children is that involving the lymph glands, especially those situated about the bronchi. The general symptoms, anemia, emaciation, cough, angioneurotic edema, fever, tachycardia and the like, are suggestive, but not as conclusive as the physical signs: tenderness of the second to seventh thoracic vertebræ, circumscribed dullness at the sternoclavicular synchondrosis or posteriorily in the interscapular space with altered respiratory murmur, whisper bronchophony and increased pectoral fremitus over the areas of dullness. A cough suggesting pertussis, very high pitched, still more an expiratory dyspnea with expiratory râles, suggest compression of one bronchus by tuberculous glands.

The x-rays are of eminent diagnostic value in this condition, revealing exactly the site and size of the glandular swelling. They do not, however, give any definite information as to the nature of this adenitis, though usually the other signs and symptoms, together with the anamnesis, leave little room for doubt. The tuberculous nature of the infection is most clearly revealed by the tuberculin test. In early childhood the cutaneous test will suffice; later the hypodermic test is to be preferred, the more so as a positive focal reaction serves to indicate the site of the tuberculous

process. In tuberculosis of the bronchial glands, this focal reaction consists in pain between the scapulæ, increased cough and thoracic oppression, tenderness to percussion in the interscapular region and over the dorsal vertebræ.

Mesenteric, cervical, supraclavicular, thoracic, axillary and inguinal glands are rarely the seat of a primary tuberculosis. More frequently they are secondary and their diagnosis will depend upon the recognition of a tuberculous focus elsewhere. It may happen that the diagnosis cannot be made with certainty without the aid of tuberculin. A focal reaction, following the use of tuberculin, will consist in a painful swelling of the affected glands.

SALVARSAN IN OPHTHALMOLOGY.

A REVIEW OF RECENT LITERATURE.

By JOHN GREEN, JR., M. D., of the Editorial Staff.

1. Baillart: The Action of Salvarsan upon the Eye. (*Bulletin gen. de Therapeutique*, November 8th, 1911.)
2. Becker: The Treatment of Syphilitic Eye Disease with Salvarsan. (Berichte der Ophthalm. Gesellsch., Heidelberg, 1911.)
3. Blanco: Salvarsan in Ophthalmology. (*British Med. Journ.*, October 28th, 1911.)
4. Chronis: Two Cases of Ocular Inflammation after Salvarsan Injection. (*Klin. Monatsbl. fuer Augenheilk.*, October, 1911.)
5. Dolganoff: The Action of Salvarsan in Eye Diseases. (Trans. *Amer. Journ. Ophthalmology*, December, 1911.)
6. Goerlitz: Treatment of Syphilitic Eye Diseases with Salvarsan. (Berichte der Ophthalm. Gesellsch., Heidelberg, 1911.)
7. Igersheimer: The Action of Salvarsan upon the Eye. (*Ibid.*)

Blanco declares that damage to the ocular structures following the injection of salvarsan is very rare; nevertheless, in view of our still rather limited experience, he considers that the fundus oculi should be examined in every case before treatment. The presence of non-syphilitic ocular disease should be considered a contraindication to the use of the drug.

Chancres of the conjunctiva and eyelids, episcleritis, chorioiditis, chorioidoretinitis, neuritis and post-neuritic atrophy were successfully treated; syphilitic iritis yielded even more readily.

Inflammatory eye conditions after the employment of salvarsan may not, in the opinion of Chronis, be attributable to the drug, but rather to the fact that all organisms have not been eliminated from the blood. He describes 2 cases of optic neuritis in which there were reasons for believing the inflammation to be of syphilitic, rather than of toxemic origin.

Baillart alludes to the fairly frequent occurrence of paralysis of the oculomotor nerves several weeks after the injection, and notes that the condition has usually cleared up after fresh injection of salvarsan or the administration of mercury or the iodides. Papilloretinitis and papillitis are probably due to syphilis remaining uncured by the remedy. Yet it is significant that nervous complications have become much commoner since the employment of salvarsan. The author is by no means convinced that the results of salvarsan therapy, as far as the eye is concerned, are superior to those obtained with mercury and the iodides. In cases of chronic and secondary glaucoma, Morax has obtained definite results, and in sympathetic ophthalmia the remedy has also acted well.

According to Dolganoff the time is not yet ripe to assign to salvarsan its rightful place in the arsenal of therapeutic remedies. Dolganoff's paper, which is a very comprehensive one, has been carefully reviewed

by Sydney Stephenson in the *Ophthalmoscope,* February 1st, 1912, as follows:—

"Does salvarsan act as a poison on the eye? As regards patients with healthy eyes subjected to the new remedy, not one of the three hundred observed by the author showed any departure from the normal that could be attributed to the drug, although, with few exceptions, they were examined one or two months after the injection. Dolganoff's conclusion is that salvarsan, employed in ordinary doses, does not act as a poison on the eye, as do some other organic compounds of arsenic, as atoxyl. Even where the remedy appeared to be contraindicated on account of some pathological condition of the optic discs, its administration did no harm. This important observation, although based (as the author admits) upon a few cases only, appears to prove the possibility of trying the remedy even when some atrophy of the optic nerves is already present.

"What forms of eye disease are likely to be benefited by salvarsan? Dolganoff has employed the remedy in (*a*) atrophy of the optic disc (7 cases), (*b*) degeneration of the ocular muscles (12 cases), (*c*) inflammation of the optic disc (7 cases), and (*d*) inflammation of the iris and ciliary body (5 cases).

"In the (*a*) group (optic atrophy) Dolganoff obtained, upon the whole, a tolerably favorable result, since, in general, the progress of the condition was retarded, and in one case, indeed, a slight improvement in sight was produced. It is clear, writes Dolganoff, that arsenobenzol has no deleterious or hastening effect on the degeneration and blindness. In the (*b*) group of cases (degeneration of the ocular muscles) good results were obtained in recent paralyses, inasmuch as three of five such paralyses disappeared rapidly after the injection of salvarsan. On the other hand, 7 cases which had lasted for upwards of one year, remained without change, irrespective of their origin, whether syphilitic or tabetic. In the (*c*) group of cases (syphilitic optic neuritis) salvarsan had no magic effect. In brief, some of the cases did well and others badly. A study of the cases points the moral that arsenobenzol is, in some instances, a wonderful ally of mercury, but as it is impossible to recognize the cases beforehand, both remedies should be used conjointly. In the (*d*) group (inflammation of iris and ciliary body) was shown the value of arsenobenzol in syphilis of the anterior part of the vascular system of the eye. It exerted a definite curative effect upon this class of case, particularly, as it would seem, when accompanied by infiltration.

"Salvarsan was also successfully employed by Dolganoff in subretinal hemorrhage of syphilitic origin. The patient also suffered from paralysis of one oculomotor nerve and from basal meningitis. But the action of salvarsan was somewhat obscured by the simultaneous employment of mercury, iodide and diaphoresis.

"To sum up, then, salvarsan was found by Dolganoff to be efficacious in iritis, iridocyclitis, recent oculomotor paralysis, and descending optic neuritis. It yielded doubtful results in choked disc and in certain cases of ascending neuritis. Lastly, it is useless in vitreous opacities, and in longstanding mydriasis and miosis. Relapses were not uncommon after its employment. One point brought out by the author is very important practically—namely, that so far as Dolganoff's experience goes, salvarsan has no untoward effect on the state of a diseased eye, even when optic atrophy is present. At the same time, salvarsan is by no matter of means a specific preparation capable of radically curing syphilitic affections of

the eye or of other parts of the body. On occasion, better results may be obtained from it than from mercury, and contrariwise, on other occasions, like mercury, it is completely useless."

Papers by Igersheimer and Becker, presented at the Heidelberg Congress, may well be considered together. T. Harrison Butler has prepared the following résumé of these papers and the discussions thereon (*Ophthalmoscope*, April, 1912) :—

"Igersheimer has injected rabbits and dogs with salvarsan and has detected no pathological changes in the retina or optic nerve. Cats are more susceptible to arsenic, and in some of them degenerative changes were found both in the retina and the optic nerve. In others the hair fell out, a well-known sign of poisoning with organic arsenic. Clinically, Igersheimer has had most gratifying results with salvarsan, but he always combines it with mercury and iodide of potassium. He has not seen any improvement in congenital interstitial keratitis, nor in paralyses of the ocular nerves. Unless the treatment be combined with a course of mercury and iodide, relapses are frequent. He believes that cases of optic neuritis or paralyses of ophthalmic nerves are due, not to the salvarsan, but to the syphilis.

"Becker is an enthusiast for salvarsan, and he, too, believes the nervous lesions, which appear to follow salvarsan injections all too frequently, to be syphilitic and not toxemic. He, too, combines mercury and iodide treatment with the salvarsan injections. Interstitial keratitis of congenital origin is uninfluenced, but the acquired form is greatly benefited. He gives an account of several cases in which the treatment was most satisfactory.

"An animated discussion followed the paper in which Seidel, Kruckmann, Pfalz, Wagenmann, Guttmann, v. Hippel, Elschnig, and others participated. There was a general agreement that salvarsan was beneficial in florid inflammations of the iris, and most of those who spoke had obtained no results in parenchymatous keratitis. The opinions concerning the nervous lesions were varied, but the majority held that they could not be ascribed to salvarsan. Kruckmann narrated a case in which the optic nerves rapidly became atrophic after an injection of salvarsan. He had examined the case and found slight pallor of the discs, but no contraction of the field for color or form. The development of complete atrophy was far more rapid than he had ever seen before in any case of tabes. The injection was given contrary to his advice. The opinion was general that salvarsan should be administered by the intravenous route. Intramuscular injections were not nearly so safe. There was also practical unanimity that unless treatment with salvarsan was combined with mercury and iodide of potassium, relapses were the rule."

Many cases are on record in which optic neuritis or paresis of the motor nerves of the eye have followed the injection of salvarsan ; and the question is being keenly debated, whether these affections are, as the name *Neurorecidiv* implies, of a syphilitic nature, or are evidence of the injurious action of the arsenical drug.

Goerlitz's paper (reviewed by Ballantyne, *Ophthalmoscope*, June, 1912) gives a résumé of current conceptions of this problem. "Goerlitz's patient, two months after syphilitic infection, received an intravenous injection of salvarsan, and a second injection three weeks later. About five weeks after the second injection, paralysis of the left third nerve occurred ; another injection was given, and three days later, there was complete ptosis and third nerve paralysis on the left side, the vision of

the right eye was slightly reduced, and the right fundus showed neuro-retinitis with hemorrhages and white patches, while the field of vision was interrupted by sector-shaped defects and a large absolute scrotoma. A few days later, mercurial inunctions were begun, and conditions were practically normal in a month.

"In forming an opinion as to the nature of such occurrences, one has to consider whether they are sometimes found in cases not treated by salvarsan, and, if so, with what frequency. Statistics compiled before the introduction of salvarsan, show that optic neuritis occurs in a fair proportion of syphilitics within a few months of the date of infection, but the investigations of Benario, and those of Géronne and Guttmann prove that early affections of the nerves have been much more frequent since the introduction of salvarsan. We are therefore dealing with a new element, which is in some way related to the employment of the drug in question. This is even more pronounced in the case of the affections of the motor nerves of the eyes, for in syphilis before the introduction of the new treatment, these were characteristic of the later stages. More-over, the form of retinitis with hemorrhages, found in Goerlitz's case, is very seldom found in this stage of syphilis, while somewhat similar changes were found after salvarsan treatment in a case of Hesse's.

"If the nerve affections were due to the drug, a continuance of the treatment would make matters worse, but in the reported cases, recovery has usually occurred with repetition of the injections. Failure to do so in some cases does not necessarily prove that the condition is due to the drug. for it is recognized that the early nerve affections of syphilis sometimes show considerable resistance to treatment, or a tendency to repeated recur-rence, even under other drugs, such as mercury. It is unlikely that the conditions are due to arsenical poisoning, since affections of the optic nerves are rare in arsenical poisoning, and paralysis of the eye muscles does not occur. Various authors speak favorably of the results of salvar-san in syphilitic affections both of the optic nerves and of the motor nerves of the eyes. Indeed, its curative effect seems to be more pronounced in these conditions than in many other eye affections of similar origin. Goerlitz points out that the characters of the visual and field defects, in the cases under discussion, support the conclusion that they are syphilitic and not toxic in nature.

"But how are we to account for the frequency of these nerve affections. even assuming them to be of syphilitic origin? Ehrlich assumes that nests of spirochætæ, especially in nerves enclosed in bony canals, like the cranial nerves, may escape the drug or receive an insufficient dose. Haike and Wechselmann add that the small amount of the drug which reaches these organisms may actually stimulate them to greater activity, and lead to the occurrence of neuritis. A similar explanation would account for the injurious effect of mercury in some syphilitic optic nerve affec-tions. Sellei suggests that the salvarsan sets free endotoxins of the spirochætæ. Géronne and Guttmann believe that some alteration in the disposition of the nerve, or in the course of the syphilitic affection itself, is produced by the drug, and Goerlitz inclines to agree that salvarsan produces a change in the type of the disease; for it has apparently been responsible for the appearance, at an early stage, of lesions which we are accustomed to see only in the later stages. For instance, after salvarsan, gummata have occurred as early as six months from the date of infection.

"So far as the treatment of general syphilis is concerned, the occur-rence of these nerve affections is of no serious significance, since they

usually recover in the course of treatment. With regard to syphilitic eye affections, we are advised to be careful in the selection of cases for salvarsan treatment, since its application is of doubtful benefit in most eye conditions. Stuelp recommends its use in cases which are refractory to mercury and iodide, or which bear these drugs badly, and in cases of ocular primary infection or in ocular secondaries which might lead to rapid loss of function. Goerlitz doubts the wisdom of applying salvarsan in the last group of cases."

DIAGNOSTIC AND THERAPEUTIC NOTES.

NEOSALVARSAN.—Schreiber (*Muench. med. Wochenschr.*, No. 17, 1912). Stuehmer (*Deutsch. med. Wochenschr.*, No. 21, 1912). Bernheim (*Ibid.*, No. 22, 1912). Ever since the production of salvarsan, Ehrlich has labored to improve the preparation, especially to render it more soluble and less toxic. In this he has now apparently succeeded. He had long known that the various sulphoxylates had the property of combining with various organic substances to form exceedingly soluble products. After many trials, he combined salvarsan with sodium-formaldehyde-sulphoxylate, with the formation of a greatly improved product, to which he has given the name neosalvarsan. The laboriousness of the undertaking is best indicated by the fact that, whereas the laboratory number of the original salvarsan was 606, the new product is the 914th substance studied. The advantages of the new substance are manifold. It is so soluble that the powder needs merely to be poured on to the surface of the water in order immediately to dissolve. The resulting solution is neutral in reaction, so that no alkali is required, and so nearly isotonic that distilled water may be used instead of saline solution. If one wants to take the rather unnecessary precaution of using an exactly isotonic solution, a 0.4 per cent. solution of sodium chloride should be used instead of the customary 0.9 per cent. solution. The presence of the inert sulphoxylate increases the bulk of the powder, so that the corresponding dose of neosalvarsan is half again as great as that of salvarsan. The toxicity of neosalvarsan is, however, considerably less than half as great as that of salvarsan, so that double the dose could, if desired, be given. The technique is very simple. The contents of the ampoule are poured into 200-250 c.cm. sterile, freshly distilled water, in which it immediately dissolves. It may then be injected intravenously. It is perhaps better to precede the injection by an infusion of saline solution, though this is not nearly so necessary as with salvarsan, the new product being much less irritating. Certain precautions must be taken. As with salvarsan, freshly distilled water must be used and surgical asepsis is indispensable. Neosalvarsan in solution oxidizes rather readily, with the formation of a poisonous product. Hence, in dissolving it, the mixture must not be shaken violently; the water must not be warm, but should be at room temperature; the solution must be used at once and must not be allowed to stand, even for an hour.

Schreiber and his assistant Stuehmer, who were the first to use it clinically, report the results of 1,400 injections, given to 340 patients. Schreiber begins with a dose of 0.9 grm. for adult males, 0.75 grm. for women, 0.15 grm. for children and 0.05 grm. for infants. Four injections are given in increasing doses, one every other day. Thus the average adult male receives 0.9 grm. the first day, 1.2 grm. the third, 1.35 grm. the fifth and 1.5 grm. the seventh. Occasionally larger doses are given, frequently smaller ones. The after treatment is as with salvarsan. His results with neosalvarsan were at least as good as with salvarsan. It

may be added that the superiority of the new preparation is even more marked for intramuscular than for intravenous use.

Bernheim's observations are based upon a much smaller material, 29 cases in all. He fully confirms the conclusions of Schreiber and Stuehmer, except that he advises a longer interval between the injections. In 4 cases he saw definite evidence of intoxication, not alarming but disagreeable. He believes that if the injections are given, not every other day, but at longer intervals, results as good will be obtained without untoward after-effects.

How Shall the General Practitioner Use Salvarsan?—Jadassohn (*Jahresb. fuer aerztl. Fortbild.*, No. 4, 1912). Salvarsan is best administered intravenously beginning with 0.1-0.2 grm. for women and 0.2-0.4 grm. for men, in order to determine the presence or absence of an idiosyncrasy. If the initial dose is well borne, 0.36-0.6 grm. may be given repeatedly, a series of 3-5 injections being given in three to five weeks. In early syphilis, still another injection or two may be given during the second month after the beginning of the treatment. These injections may then be advantageously followed by a mercurial course. Salvarsan is indicated in primary syphilis, in all cases refractory to mercury, and in malignant syphilis, syphilis during pregnancy, lues congenita tarda, early tabes and paresis. The only contraindication is to an unduly large initial dose.

It will be seen that this standpoint differs in several respects from the current notions regarding salvarsan medication. The opinion of so competent and experienced an observer as Jadassohn deserves, however, respectful consideration.

A New Test for Pregnancy.—Abderhalden (*Muench. med. Wochenschr.*, No. 24, 1912). The study of anaphylaxis has shown that whenever a foreign proteid is introduced into the circulation, the tissues react with the production of a ferment, possessing the power of disintegrating this proteid. The proteids of the placenta, especially of the chorion, act as foreign proteids and cause the appearance, in the blood of the pregnant woman, of ferments able to disintegrate them. If placental extract is mixed with ordinary blood-serum, no change results. If the blood-serum was, however, obtained from a pregnant woman, the placental proteids are disintegrated, with the formation of peptones. The test, which may become of great practical importance, is done as follows. A mixture of human placental extract and the serum to be tested are placed in a dialyzing tube, the latter being immersed in distilled water. The appearance of a biuret reaction, in the latter, indicates that the serum was obtained from a pregnant woman.

Animal Charcoal.—Adler (*Wiener klin. Wochenschr.*, No. 21, 1912). Adler reports encouraging results, in gastro-intestinal disease, from the administration of animal charcoal in larger doses than have hitherto been customary. He gives from .6 to 10 grm. daily, divided into two or three doses. The best results were obtained in intestinal diseases in which the disorder depended less upon an organic lesion of the gut than upon an abnormal content. In acute and chronic gastro-enteritis and enteritis,

and in 2 cases of diabetes with chronic diarrhea, good results were obtained. The success or failure of charcoal medication may give diagnostic information regarding the absence or presence of an organic intestinal lesion.

LAPAROTOMY IN PERITONEAL TUBERCULOSIS.—Heimann (*Zeitschr. fuer Geburtsh. und Gynaek.*, Vol. 70, No. 1). Fifty cases of peritoneal tuberculosis, subjected to laparotomy, were observed for ten years after operation or, in case the patient did not live so long, up to the time of his death. The conclusions drawn from this series do not confirm the general opinion regarding the value of operation in this disease. The mortality during the first six months after the operation is great. Moreover, among those who apparently recover, a considerable percentage show progressive pulmonary involvement and, for this or other reasons, never become able to return to work. The writer believes that, the greater the period of time during which the surgeon follows up such cases, the less enthusiastic he will be regarding operation. Certainly all advanced cases, all cases with objective pulmonary lesions, all febrile cases, and finally all varieties of peritoneal tuberculosis, except the exudative serous form, must be considered unsuitable for operation.

APPENDICITIS IN CHILDHOOD AND OLD AGE.—Billington (*Brit. Med. Journ.*, May 25th, 1912). In children under twelve years, appendicitis runs a much more acute course than in older individuals. For this reason, a conservation course of treatment, in these cases, often results in perforation. A sudden cessation of pain, with a fall in the temperature, is in children much more apt to indicate perforation than improvement. Similar statements might be made regarding the course of appendicitis in elderly people. In both groups, recovery can be expected only as the result of the earliest possible operation; neither group bears operation at the height of the disease well.

HISTOPIN.—Beck (*Med. Klinik*, No. 22, 1912). Wassermann has produced a gelatinous extract of staphylococci, that seems to be effective for local immunization of the skin in infectious dermatites, especially in childhood. The gelatine is applied locally and acts beneficially in all superficial staphylococcus infections, such as folliculitis, pustules and small furuncles. In deeper infiltrations, the effect is not so marked, but even here may be noticeable. Impetigo sometimes reacts promptly to histopin, sometimes not at all. In general, it may be said that, unless a decided effect has been obtained within a week, none need be expected.

MILK-FREE DIET IN SPASMOPHILIA.—Raabe (*Therap. Monatsh.*, No. 5, 1912). In 7 cases of spasmophilia, the writer has observed good results following the entire withdrawal of milk from the child's dietary. This regimen is however permissible only when it is not contraindicated by the child's general condition. Meat, vegetables, starchy foods and butter must be given freely.

AN INTERESTING CHAPTER IN HYGIENE.

That we are really in advance of previous ages in the matter of hygiene is a twice-told tale the repetition of which here would be unpardonably supererogatory. But though we are well aware of this, what we do know so well is the exact status of hygiene, both public and private, centuries ago. The following extract from Dr. M. A. Legrand's "La Longévité à travers les âges" (Longevity through the Ages), recently published by Ernest Flammarion in Paris, is not only enlightening as to the travail through which the study of hygiene had to pass until its worth was appreciated, but has an historical import that will carry to the reader a very good idea of the state of French society in the seventeenth century:—

If we wish to note a decided progress in the matter of longevity between the representative people of the upper classes in modern times and those who were of equal prominence in the Middle Ages, it is only in the seventeenth, or better in the eighteenth century, that improvement becomes apparent. In those two centuries the average duration of life was prolonged from sixty-four years and five months to sixty-seven years and five months.

Without a doubt the Renaissance was an awakening of humanity, and of the intelligence which had long been enshrouded in the dense fogs of previous ages. But though intellectuality and well-being are incontestable factors as regards longevity, they alone cannot compensate for an absolute ignorance of the laws of hygiene so necessary to safeguard at the same time the health of individuals and the preservation of communities. Now it can be said with certainty that all laws of hygiene were unknown to our ancestors; these being modern scientific conquests. From the Middle Ages to the present time nothing that could be considered efficacious was done to further public health; the mortality was at a high rate and the duration of life short. Truth to say, this could not have been otherwise.

Let us see what means were used in former times to stamp out epidemic diseases.

During the first epidemic of plague in 1348, the burning of a number of Jews, who were accused of having poisoned the wells, was deemed a ready means to vanquish the disease. The fanatics succumbed to the insanity of the Flagellants, and Philip of Valois ordered cutting off the lips and the tongues of the blasphemers. As sanitary measures these proceedings were not among the best; and the numerous and terrible epidemics of plague in Milan, in London in 1665 and in Marseilles in 1720 showed no abatement. Though science in the past two hundred years had made a great advance on account of Paracelsus, Vesalius, and Eustachius, the anatomical discoveries of Fallopius and Varoli, the surgical triumphs of Ambroise Paré and his pupils; though these authorities had described sweating-sickness, syphilis and typhus;

that which concerned the genesis and propagation of infectious diseases was a closed chapter to our ancestors. Of the means of preventing contagion and infection, how to hold them in check by combative measures, the idea was yet to be born. All epidemic diseases were known as plague, though the epidemic may have been due to sacred fire, St. Anthony's fire, or black death; but whether it was the one or the other, the age and social position of the individual did not exempt him from contracting the disease, for each time there was a visitation rich and poor alike were victims. The authorities warned the public by precautions which were as vague as they were insufficient; a truss of hay or straw was to be placed at the door of the house in which the plague-stricken lay, a white rod was to be carried to guard the passer-by from contact with those who were compelled to associate with the sick. To shun the sick and those who frequented their homes was considered of prime importance, since the disease was carried around by them and was also in the air immediately surrounding them.

These precautions obtained at Amiens in 1501. Later, that is in 1514, the hog was tabooed in the infected regions and the sale of furniture and clothes belonging to the sick was stopped. No doubt this was a step in the right direction, but what became of the wearing apparel which certainly was not destroyed, much less disinfected? And the blood, which was quite plentiful in those days of blood-letting therapy, was ordered to be emptied into the rivers and not under any circumstances allowed to be flung into the street. At sight this was not an unwise precaution; but, when we remember that in those far-off times nothing but water was drunk, its good points vanish. Be it added here that, just as in the preceding centuries, the scoffers of these primitive hygienic laws, who thought lightly of all rules and regulations, found themselves imprisoned and fined for that worst of all crimes in those days—blasphemy. Verily, plague was "one of the scourges of God," a castigation of blasphemy and other sins; and it bred the sort of fatalism and resignation that results from believing in the proverb—God helps those who help themselves.

At the end of the seventeenth century, during the reign of Louis XIV, thanks to the influence of Hoffmann, Boerhaave, Tissot, Fabricius von Hilden, and above all Haller, public hygiene received an impetus throughout Europe and especially in France. Committees to look after the health of communities were in embryo, and measures against epidemics received some attention. The doctors of this period bethought them of what had happened at Athens when, by the advice of Hippocrates, a devastating plague had been crushed by bonfires in the public squares. Desirous of emulating and even surpassing Hippocrates, the municipalities ordered salt, frankincense, sulphur, gunpowder, alum, resin, arsenic, and antimony to be thrown on the fires; substances which would purify the air and drive away the miasms. But is it not a fact that but a century ago the hold of a ship was purified by using a red-hot ball plunged in tar, the fumes of which were supposed to destroy germs and dangerous emanations? Truth compels us to admit that, with our knowledge of what was not known of hygiene in former ages, to expect greater progress would be an admission of a foolish optimism.

While the fight against epidemic diseases was futile enough, what really arouses our indignation and disgust, when contemplating the times under discussion, is the gross carelessness of our ancestors for all that pertains to urban hygiene and sewerage; lapses which cannot

but account for the spread of the worst catastrophies and a low degree in the length of life. Most of the towns were surrounded with high walls along which ran slimy ditches which were veritable cloacas. The high houses, whose roofs on account of the narrowness of the streets almost touched the roofs on the opposite side, obstructed the sun's rays, so that the obscurity was that of a winter, dark and humid, and the soil miry after the slightest rainfall. The streets were narrow, short and anfractuous; everywhere there were angles, bends and blind alleys which interfered with the free passage of air. No paving, no drains, no sewers, no water for cleaning; according to the season either blinding dust or mud and withal an uncleanliness that was never remedied. Such were the cities that lured plague, black pox, and putrid fever (typhoid) to abide with them long enough to kill off half, and sometimes two-thirds, of their population!

In 1418 when the great epidemic raged in Paris, the deaths amounted to 80,000 souls out of a total population that did not surpass 300,000. When the municipalities at last took a serious view of the situation at the end of the seventeenth century, that is about 1663, Europe had sacrificed in four years 77,000,000 people through epidemics and contagious diseases.

During the reign of the Sun-king, things hygienic improved in France, especially among the upper classes, by comparison with what had been tolerated in the Middle Ages. But the progress was only apparent; for, if the truth is wanted as to what obtained in the matter of urban hygiene, let the reader transport himself in thought to the palace of Versailles in the year of grace 1695. What will strike him at once are the number of holes and the odor emanating from them: holes wide open in various parts of the palace. But this convenience (?) did not prevent the occupants from relieving themselves wherever most convenient—the lower sections of the doors, the walls, and the balcony bore witness thereto. There was no bath-tub in the whole palace, but three hundred close-stools were provided, one for each room. If all the occupants of the palace followed the example of the king, it is easy enough to believe that these stools were rarely unoccupied. Louis XIV, who passed considerable of his time on this plebeian throne, was surely misnamed when he took the sublime name of Sun-king; and that he was not ashamed to receive ambassadors and courtiers in a posture that would bring the blush of shame to the cheeks of a lesser man, is attested by many historical notes. When traveling, despite the ladies in his suite who accompanied him, this monarch was never known to leave his coach to relieve himself; and, when one remembers how often he had to answer a call of nature, the awkwardness of the situation becomes at once apparent. But the Sun-king could do nothing awkwardly, for when the psychological moment arrived the august ladies were told to look out of the windows and admire the scenery! Moreover the cushions were large and soft.

Despite the luxury of the park of Versailles, the groups of trees and the walks harbored pools of urine and heaps of excrement. And this disfigurement of one of the most beautiful parks in the world extended to the very walls of the palace. But this can be easily understood when the fact is recalled that in those days no one had the slightest hesitancy to empty a bed-vessel out of the window. One day, the dauphin's sedan-chair was the recipient of this sort of a downpour, and the suite of courtiers, almoners, and lackeys were so copiously bespattered that they fled in haste, and amidst great laughter changed their clothes. The

saintly king Louis IX received a like baptism one night in the streets of his beloved Paris.

What were the personal habits of the people? The church having suppressed the sweating-houses as places of debauch and iniquity, apparently the impression was that it was impossible to get any water for cleansing purposes. Assuredly this is the epoch for not washing the face because water might harm the complexion, or the hands; it is also the epoch for not changing one's linen. In fact, it would have been considered bad form to do these, for we are now in a period when intellectuality and filth have reached their apogee. Vermin bothered the Sun-king at night; while, under their rouge and gigantic coiffures, the court ladies sheltered in emulation of one another swarms of parasites!

BOOK REVIEWS.

DENTAL DISEASE IN ITS RELATION TO GENERAL MEDICINE. By J. F. Colyer, L. R.
C. P., M. R. C. S., L. D. S., Dental Surgeon to Charing Cross Hospital and
the Royal Dental Hospital; Member of the Board of Examiners in Dental
Surgery of the Royal College of Surgeons, England; with the assistance
of Stanley Colyer, M. D., London, M. R. C. P., D. P. H. With illustrations.
New York: Longmans, Green and Company. 1911.

Colyer's exposé of "Dental Disease in its Relation to General Medicine," is
a most timely contribution to present medical literature; it is the best contri-
bution in this particular branch of medical science since the appearance of
Hunter's monograph on "Oral Sepsis," in 1901. The ten chapters of the
volume are mainly concerned with dental caries, oral sepsis, diseases of the
peridental membrane, those set up by reflex dental irritation, treatment of
children's teeth and dental diseases in relation to life insurance. While from
an American point of view we may take exceptions to a number of statements
made by the author, these views are largely theoretical and, consequently, have
little or no value when compared with the eminently practical part of the book.
We are sorry to state, however, that the oral manifestations of certain general
diseases, as for instance, diabetes mellitus, locomotor ataxia, etc., have not
received the necessary attention. The perusal of this little volume will ma-
terially aid the medical practitioner in the comprehension of the hitherto much
neglected question of oral diseases.

TEXT-BOOK OF OPHTHALMOLOGY. In the Form of Clinical Lectures. By Dr. Paul
Roemer, Professor of Ophthalmology at Greifswald. Translated by Dr.
Matthias Lanckton Foster, Member of the American Ophthalmological So-
ciety; Member of the American Academy of Ophthalmology and Oto-
Laryngology. With One Hundred and Eighty-six Illustrations in the Text
and Thirteen Colored Plates. Volume I. New York: Rebman Company.
Price, $2.50.

The volume under review is No. I of a three volume treatise on ophthal-
mology. This work deserves more than passing notice for a variety of reasons.
In the first place, the subject is presented in the form of a series of clinical
lectures, instead of being divided into formal and (shall we say) stereotyped
chapters. This method should, a priori, tend to a casual and unfettered ex-
pression grateful to the reader of the stilted paragraphs of the average textbook.
The ordinary familiar language of the clinic is employed by Roemer with con-
summate skill to paint a vivid picture of the clinical and pathological aspects
of the actual patient. The application of the results of the study of immunity
to diseases of the eye and, indeed, the study of immunity itself is developed
more thoroughly than in other textbooks. Conflicting theories in regard to de-
tails of anatomy, physiology, etc., are contrasted, and finally, the author's own
opinion, in moot points, is logically and clearly expressed.

The illustrations, photographic and otherwise, are beautifully executed. The
colored plates, also, represent with remarkable fidelity of drawing and colora-
tion, various external ocular diseases. No practitioner interested in diseases
of the eye, whether specialist or not, can afford to be without this splendid work.

THE TREATMENT OF SHORTSIGHT. By Professor Dr. J. Hirschberg, Geh. Med.
Rat in Berlin. Translated by G. Lindsay Johnson, M. D., F. R. C. S.
With Twelve Illustrations. New York: Rebman Company. 1912. Price,
$1.25.

In this interesting monograph of 120 pages, Professor Hirschberg considers
in much detail the many aspects of the myopia problem which is still, in spite
of the earnest efforts of school sanitarians and the ophthalmic profession toward
improving the external conditions of school life, a live issue in Germany, and
to a less extent in other continental countries.

Hirschberg is an advocate of partial correction of high myopia and cites

numerous cases in support of his contention. American oculists will view with surprise, and probably disfavor, his advice to abandon glasses in some cases of moderately high myopia (10 D.) and to rely on prolonged abstention from near work and hygienic measures as the sole means for preventing an increase in the degree of the trouble. Nor can we follow him in his views as to the uselessness of cycloplegics preliminary to ascertaining the refraction. Does the statement, "the correction of astigmatism for working glasses is important," imply that we may disregard astigmatism in prescribing the distance correction? The reviewer has had occasion, in several instances, to correct the refraction of myopic individuals wearing minus spherical lenses on the prescription of eminent German and Austrian ophthalmologists and has invariably found that an astigmatism of from 1 to 2 Dioptres has been overlooked or, what seems more likely, intentionally disregarded by his predecessors. The erroneous notion of the innocuousness of moderate astigmatism, complicating myopia, seems to have thoroughly permeated the continental mind. May not the greater frequency of high myopia in continental countries be due, in part, to the failure to correct a complicating astigmatism?

The author takes a definite stand against removal of the lens in high myopia, and is by no means enthusiastic about the operative treatment of detachment of the retina. The monograph bears on every page the imprint of a scholarly mind of ripe ophthalmological experience. The translation by G. Lindsay Johnson is of a high order.

DUODENAL ULCER. By B. G. A. Moynihan, M. S. (Lond.), F. R. C. S. Leeds. Second Edition, Enlarged. Illustrated. Philadelphia and London: W. B. Saunders Company. 1912. Price: Cloth, $5.00; Half Morocco, $6.50.

The second edition of this excellent work has followed so closely upon the first, that few changes were necessary to keep it entirely up to date. The differential diagnosis of duodenal ulcer has been carefully rewritten, and special emphasis has been placed upon those points in differentiating, which Moynihan has always so strongly urged upon the profession. Some space is devoted to a consideration of the so-called "hunger-pain," and the writer attempts to make clear his interpretation of this symptom. The chapter on diagnosis now includes the use of the bismuth meal and x-ray as an aid, laying emphasis upon the rapidity with which the stomach empties itself when a duodenal ulcer exists. A separate appendix, which includes a detailed statement of all cases operated in 1909 and 1910, has been added. This makes it possible to compare the results of the earlier and later cases. The book is another example of the very excellent work which is being done by Moynihan.

PRAKTISCHE ERGEBNISSE DER GEBURTSHILFE UND GYNAEKOLOGIE. Herausgegeben von E. Bumm, Berlin; Doederlein, Muenchen; K. Franz, Berlin; und J. Veit, Halle. Vierter Band, erstes Heft. Wiesbaden: J. F. Bergmann. 1911.

These reviews of "Practical Results" written by the most competent gynecologists of Germany seem not as well known among American obstetricians and gynecologists as they fully deserve to be. The first number of the fourth volume which has just appeared, contains the following articles: Basedow's Disease and the Sexual Life of Women by Birnbaum; The Prohibition of Lactation in Tuberculous Patients by Noeggerath; The Retention of Portions of the Ovum and Placenta by Dehnicke; Diagnostic and Therapeutic Value of Gonococcus-Vaccine in Gonorrhea of Women by Runge; and Investigations into the Origin of Puerperal Infections by J. Veit.

Each writer presents a thorough analysis of all the work done in the matter which he is considering, particular attention being given to a proper emphasis of the practical results achieved.

A TEXTBOOK OF GYNECOLOGY. By William Sisson Gardner, M. D., Professor of Gynecology, College of Physicians and Surgeons, Baltimore, Md. With One Hundred and Thirty-eight Illustrations in Text. New York and London: D. Appleton and Co. 1912.

The writer of this volume has set himself the task of presenting modern gynecology in a small book for the "over-crowded" student. He has solved this problem in an extremely satisfactory manner. His brevity nowhere interferes with clearness, as may be seen, for instance, in the manner in which he considers the important question of uterine carcinoma. In the discussion of endometritis the most advanced ideas are given in a succinct manner. His views on dysmenorrhea are presented in a way, probably well adapted to teaching

purposes, but not quite in harmony with the opinion of most gynecologists. And in no carping spirit it may be stated that it is the hope of the reviewer of this book that in the next edition, which probably will be in demand judging from the intrinsic value of this contribution to gynecology, the spelling of "labium major" will be changed to "labium majus."

Die Methoden der Untersuchung des Magens und Ihre Diagnostische Verwertung. Von Dr. Emil Schuetz, Privatdozent an der Universitaet Wien. Mit 29 Textabbildungen. Berlin: Urban and Schwarzenberg (Rebman Company, New York). 1912. Price, $2.75.

This monograph of two hundred and fifty pages undertakes to describe quite completely the different methods of stomach diagnosis. The author takes up with much detail the examination of the stomach contents. The x-ray examination of the stomach is reviewed quite critically. This x-ray section of the book is an exposition of the work of the Viennese school of radiologists, and it is very satisfactory to have this all together, as up to the present there is no textbook upon the subject from these exponents of the fluoroscopic methods. There is an appendix upon the biological method of carcinoma diagnosis. The monograph is supplied with a good running bibliography. While the book is essentially for the specialist, it would be a great gain for the medical profession if a greater number of general practitioners became familiar with the value of the methods described.

Delayed and Complicated Labor. By Robert Jardine, M. D. Edin., M. R. C. S. Eng., F. R. F. P. Glas., F. R. S. Edin., Professor of Midwifery in St. Mungo's College, Glasgow; etc. Author of "Clinical Obstetrics," and "A Practical Text-Book of Midwifery for Nurses," etc. With One Hundred and Seven Ilustrations and Three Colored Plates. New York: William Wood and Company. 1912.

With justifiable pride the author states that his is a one-man book. It embodies his personal experience with delayed and abnormal labor during eighteen years of active work in the Glasgow Maternity and Women's Hospital, a hospital in which, as we are informed, the percentage of abnormal cases dealt with is exceedingly high. It is obvious that the writer speaks authoritatively on practically every problem of complicated labor, simply considering his own experience and his own results. This very fact, together with the absence of extensive statistical quotations from the literature, renders the perusal of this volume especially attractive and instructive.

Common Disorders and Diseases of Childhood. By George Frederic Still, M. A., M. D. (Cantab.), F. R. C. P. (Lond.), Professor of Diseases of Children, King's College, London, Physician for Diseases of Children, King's College Hospital; etc. etc. Second Edition. New York: The University Press. Price, $5.50.

The second edition of Dr. Still's excellent book retains all the distinctive features which characterize the original. It is not an ordinary textbook; it is a discussion of many conditions often seen in childhood. The personal note in these discussions is an element of great value, for Dr. Still speaks from the accumulated wisdom of long experience. A keen observer, a skilled investigator, he has embodied in this performance the results of many studies. It has been brought thoroughly up to date, and several additions of value have been incorporated, notably discussions of epilepsy, adenoid and tonsillar hypertrophy and asthma.

Dr. Still's style is clear and forceful, and the value of his book is enhanced not a little by the method of presentation of its subject-matter.

Progressive Medicine. A Quarterly Digest of Advances, Discoveries and Improvements in the Medical and Surgical Sciences. Edited by Hobart Amory Hare, M. D., Professor of Therapeutics and Materia Medica in the Jefferson Medical College, Philadelphia; Assisted by Leighton F. Appleman, M. D., Instructor in Therapeutics, Jefferson Medical College. Philadelphia. Volume XIV, No. 2. June 1st, 1912. Philadelphia: Lea and Febiger. Price, $6.00 per annum.

This number contains reviews of literature on the following subjects: Hernia, by William B. Coley; Surgery of the Abdomen, by John C. A. Gerster; Gynecology, by John G. Clark; Diseases of the Blood, Diathetic and Metabolic Diseases, etc., by Alfred Stengel; and Ophthalmology, by Edward Jackson.

PUERPERAL INFECTION. By Arnold W. W. Lea, M. D., B. S. (Lond.), B. Sc. (Manch.), F. R. C. S. (Eng.). Lecturer in Obstetrics and Gynecology, The University, Manchester; Surgeon, Northern Hospital for Women; Assistant Surgeon, St. Mary's Hospital; Manchester University Scholar and Gold Medallist in Obstetric Medicine. New York: Oxford University Press. 1910. Price, $9.00.

While the graver forms of puerperal infection undoubtedly have become rarer, this infection still is responsible for almost one-half of all deaths occurring in connection with childbirth, and is the source of subsequent ill health in a vast number of cases. This fact alone will justify the presentation in a special work of all the information acquired in the last twenty years concerning the etiology, bacteriology, pathology and therapy of puerperal infections. Especially in respect of therapy, distinct advances have been made in recent times in regard to surgical interferences and also in the specific treatment of the infections by means of serums and vaccines. All these questions are thoroughly discussed in this new work of 400 pages, a volume unsurpassed as to excellence of illustrations and attractiveness of print and binding.

THE TIGHTENING OF LOOSE TEETH. Some Technical Innovations by Surgeon-Dentist Witkowski (Berlin). Translated from the first German edition by Edgar Neumann, M. D. and William M. Gabriel, M. R. C. S., L. D. S., Eng. Illustrated. London: Baillière, Tindall and Cox. 1912.

Whether the reader of this little volume agrees with the author or condemns his whole method of procedure will be largely a matter of personal conception. There are many practical hints and valuable suggestions regarding the mechanical fixing of loose teeth and of crown and bridge-work in general which are deserving of notice. On the whole, however, our present conceptions of oral antisepsis are incompatible with a lot of mechanical appliances placed in the mouth for the support of a few loose teeth, which are bound to collect filth. If the reader approaches the book with the hope of gaining some information regarding newer methods of saving teeth, he will be sorely disappointed.

NEW AND NON-OFFICIAL REMEDIES. 1912. Containing Descriptions of the Articles which have been Accepted by the Council on Pharmacy and Chemistry of the American Medical Association prior to January 1, 1912. Chicago: American Medical Association. 1912.

This book contains descriptions and a statement of the actions and uses of all articles which have been examined and accepted by the Council on Pharmacy and Chemistry prior to January 1st, 1912, for inclusion in the list of New and Non-Official Remedies. The book is unique in that nowhere else can the physician or the pharmacist turn for reliable, unbiased information concerning the new remedies. It should be in the hands of everyone of them.

A MANUAL OF CLINICAL CHEMISTRY, MICROSCOPY, AND BACTERIOLOGY. By Dr. M. Klopstock and Dr. A. Kowarsky of Berlin. In Their "Institut fuer medizinische Diagnostik," in Berlin. Only Authorized Translation from the Last German Edition, Thoroughly Revised and Enlarged. Illustrated with Forty-three Textual Figures and Sixteen Colored Plates. New York: Rebman Company. 1912. Price, $3.00.

This is one of the best of the numerous brief manuals of clinical chemistry and microscopy now on the market. It is especially suitable for the office laboratory of the scientific practitioner since it assumes in the reader a considerable degree of laboratory training. Numerous illustrations and an adequate index add to its value.

THE NEW POCKET MEDICAL FORMULARY. With an Appendix. Containing Formulae and Doses for Hypodermic Medication; etc. etc. By William Edward Fitch, M. D., Editor of Pediatrics; Adjunct Attending Gynecologist Philanthropian Hospital; etc. etc. Philadelphia: F. A. Davis Company. 1912. Price, $2.00.

This little book of 500 pages, on specially thin-made opaque paper, bound in elegant flexible leather, may be correctly termed a pocket practice of medicine for every-day use. Besides a long list of prescriptions for a great variety of conditions, it contains a number of tables and brief instructions regarding emergencies. The young practitioner should find it useful.

INTERSTATE MEDICAL JOURNAL.

EDITORIAL.

THE LONGEVITY OF ATHLETES.

The harmfulness of athlete "training" is receiving a deserved amount of study now that the Surgeon-General of the Navy has reported that officers noted as athletes, during their cadet life at the Naval Academy, were breaking down sooner than the non-athletic. As to be expected, the physical directors of the Universities are unanimous in denying the charge that the systems they practise to prolong life and increase efficiency are having the opposite effect. One of them said that he had not seen any adverse results in twenty years, but the Surgeon-General has most accurate data as the officers are observed closely until sixty-two years of age. We need not discuss the charge that the Surgeon-General did not have accurate data, since he was dealing with disabled officers, nor need we mention the other objections which are not backed up by facts. The only one who should be given serious consideration is Dr. Wm. G. Anderson of Yale, whose statistics show how figures can be misinterpreted. He reports the known deaths of 12.9 per cent. of all who have graduated in the last fifty years, but the mortality among those whose athletic performance had entitled them to wear the "Y" was only 7.2 per cent. Upon this he bases the conclusion that athletic sports do prolong life, prominent insurance actuaries concurring. As any errors of omission affect each side equally but do not disturb the proportion, we may ignore them, but the real error is the failure to make full allowance for the fact that the "Y" men are a superior class to begin with, and that their expectation of life is congenitally great, while the non-athletes include the weaklings and diseased unable to compete for the "Y" and the failures among those who try for it. The frail and diseased lower the life expectancy of the class very materially.

We have no hesitation in predicting that if Dr. Anderson could compare the "Y" men with those of equal physique who did not go in for athletics, he would find the latter to have less than 7.2 per cent. mortality. This is what Dr. Stokes has done as to efficiency and endurance. Every candidate for a cadetship is rejected if there is the least doubt as to his ability to give thirty years of efficient service to the Navy—and it is a strenuous life which the athletes cannot stand as well as the others. Dr. Anderson reports that consumption, pneumonia, heart failure, dissipation, and suicide caused over 42 per cent. of the deaths of "Y" men, and that the consumption rate was the same as in the population at large in these ages. Picked men should have less rates and there is only one legitimate conclusion to form,—the one which has long been held on general principles by hygiene,—namely, that the exertions of modern specialized athletic contests do strain the organism beyond the safety line, reduce resistance to disease, exhaust the nervous system more or less, reduce efficiency later and shorten life. This has been proved in the navy and can be deduced from Dr. Anderson's statistics. We are sorry that the controversy has arisen, for it is liable to obscure the real point,—play and fun are absolute necessities for the development of the young of every mammal. The first few years in school must be largely devoted to play with change of occupation frequently to avoid the serious damage of straining the feeble powers of attention. College men must have fun and sport to profit by the curriculum to the fullest, and like all other mammals they must have friendly contests which imitate the struggle for existence of their parents. No mammal attempts anything else since he has not the equipment. The college man's contests, in matters for which he has no natural equipment for which he must be "trained" or "strained," and for which he has no future need, are therefore unscientific and harmful. Mankind does not survive through running Marathons or playing football, and all such unnatural contests requiring training of exceptional men not needing further development must be replaced by sports in which all can compete. To do this, we must, of course, ignore the opinions of the men who make their living by the present system. They are all convinced they are right; and that very condition of mind blinds them to the significance of the facts published by Dr. Stokes. Any system, which does not reduce the tuberculosis rate of perfect men far below that of the imperfect, is too horrible to tolerate a minute longer,—our actuaries to the contrary notwithstanding.

THE SOCIAL VALUE OF MEDICINE.

The sociological value of the science and art of medicine are both receiving much attention of late and it is good augury for the future. Laymen do not seem to realize what profound changes in civilization have resulted from scientific medical discoveries since the middle of the nineteenth century. The practical application of these discoveries has made it possible for swarms of people to live in health and comfort where formerly death was the penalty of invasion. Modern cities would melt away in six months were we suddenly to deprive them of modern sanitation. Indeed, the whole framework of modern life is built up of sanitation, and it is now also recognized that in the case of the sick the profession has a duty which is semi-public, even if it is primarily a personal service to the patient, for we are constantly preserving lives society can ill spare. Professor C. R. Bardeen made this social value of medicine the subject of his commencement address at Rush College, and it is to be hoped that sociologists and economists the world over will take up the crusade started by Prof. Fisher and his colleagues of Yale University for the conservation of life and health—the best of our national resources. There have been mistakes made in this movement and there will be more, for nothing human is perfect, but minor errors should not permit us to be lukewarm towards a great movement for the betterment of society on medical lines. Farmers often know more about raising pigs than babies, and we spend immense sums to teach them how to feed their hogs but not a word as to how to feed their boys. This public callousness as to human life is slowly melting; and we find that public opinion is now tolerating some invaluable food investigations by governmental scientists, and we expect to see a time when it will demand them. But that time will not come unless we have many more such addresses as Bardeen's—and delivered to laymen, too. They are the ones who make public opinion, and they should demand to have all diseases cleared up by organized effort instead of the haphazard work of self-sacrificing private investigators. This is not paternalism,— the *bête-noire* of so many who fear oppression and even complete loss of personal liberty, but merely a common-sense proposition to keep alive as long as life is worth living. What we most want—health—is the least considered by governmental agencies. Let us make a beginning of a change. The increasing demand for a governmental department devoted to all public health matters should soon be strong enough to show results, but there will be no action taken until the voters are overwhelmingly in its favor. It is the time for talk.

VITAL STATISTICS.

America's neglect of vital statistics is one of the curious phenomena of our free and easy ways of government. Sickness and death are looked upon as family matters in which governmental intrusion is an impertinence. Few people, even among legislators, have the least idea of the sanitary importance of exact knowledge of the diseases which are afflicting us. The result is that in wide stretches of our country where life is so precarious that insurance companies decline all applications, we can take no steps to prolong life and preserve health, because we do not know what is injuring or killing the people. We do not know where to begin, even with our advice, until we have made the diagnosis. In Europe death registration has become universal, as a guard against murder, and birth registration is largely insisted on by the parents as a precaution to prove up property inheritance later. So it was easier to extend the reports to include other matters which have enabled sanitarians to aim at definite objects.

Physicians, particularly in districts where the laws are lax or defective, have a duty to perform in the way of educating the public up to the need of accurate reports. The matter of a uniform system for each state has been taken up, and a model bill prepared by the American Medical Association, which has received the approval of numerous sanitary and legal associations, but there is very little likelihood of its becoming law unless there is a public opinion demanding it. There is also very little likelihood of a public opinion until the medical profession creates it. The lay press is the only medium by which we can reach these real law-makers—the people themselves—and we must use that means for this important duty,—the sooner the better, for the present scandalous neglect to record matters of life and death is intolerable.

ARTIFICIAL FERTILIZATION.

Artificial fertilization of the lower forms of animal life has been investigated by several observers, among whom Jacques Loeb stands most prominent. Other investigators have carried the work to higher animals, and successful inoculations of mares with horse spermatozoa have been reported. A field with such intense speculative and perhaps practical interest was bound, sooner or later, to be invaded by men who wished to carry out experiments on the human subject, and, as a matter

of fact, quite a few reports have been issued dealing with the question as related to the human species. Such studies were naturally undertaken in cases where some anomaly or disease of the procreative function in either husband or wife prevented conception, and where the desire for children could not be gratified in the usual manner. Some of the reports present figures for successful vaginal inoculation with semen which certainly must be accepted *cum grano salis.*

Recently, however, Doederlein has published a most interesting and scientific review of the subject, and has reported one undoubted case. His speculations on the underlying possibilities of the practical application of the method are filled with philosophical interest, but he emphasizes the rarity of successful inoculations. He also has shown that intracervical injections are not without some danger, as is not unexpected when one considers that by the method foreign material is directly introduced into the uterine cavity. That the operation is feasible and at times successful is shown by one of his cases in which pregnancy followed and ran a normal course. In several other cases, however, attempts at fertilization by syringe injection were not productive of pregnancy. On the whole, the impression gained from knowledge of what has already been done along these lines is that artificial fertilization as a therapeutic measure must be employed with great caution and with the understanding that only a small percentage of inoculations will prove effectual.

OPINION AND CRITICISM.

PATHOLOGY OF LOWER ANIMALS.

Glandular fever and other lymphatic swellings have become important questions of state medicine, now that the plague bacillus has secured a temporary or permanent residence in our Western rodents. Some of the cases are clinically indistinguishable from mild plague, and it is quite possible for the latter infection thus to creep East unobserved, particularly where the local physicians are accustomed to the presence of epidemics or endemics of glandular fever. The etiology of all these unknown infections must be cleared up in the interests of public health.

It must be assumed that there is more than one infective agent. It seems that the lymphatic glands are merely doing their duty of protecting the whole body by arresting the invaders, so that the symptoms may be quite similar in a variety of infections. The plague bacillus has now been proved to be a normal resident of certain rodents in Asia. Its occasional excursions abroad and invasion of other animals are rather to be looked upon as preventable accidents, for it has utterly failed to acquire a permanent home elsewhere, though it has killed untold millions of people in the attempt. Immunity or tolerance is not evolved that way, but by a very slow process in which only a few are killed off in each generation. Those organisms for which we now have defenses have doubtless been with us for very many thousands of years, perhaps millions for all we know. It seems, therefore, that in searching for the cause of the infections which merely attack a short time and are rarely fatal of themselves, we should look to the domestic animals as the permanent hosts. It is a field of investigation we have neglected long enough. A short but distressing fever of Central Europe has been proved to be due to an organism transmitted from a species of owl by the midge which bothers it, and there is no reason to doubt similar infections from caged birds or domestic fowls.

There is a chance for someone to make himself immortal by merely keeping an eye open for coincidences, as King did in the case of malaria and Finlay in yellow fever. Both these observers saw the relation of mosquitoes to these respective diseases, but were unfortunate in being so situated as to be unable to prove the matters experimentally. We are all on the lookout for the sources of disease, so it has become almost automatic for us to inquire into diseases which we know are acquired from some prior case, but where the cause is unknown and does not come from a human being, we do not know where to look. The source

may be in some pet or the farm-yard animals. It is now known that the European sand-flea causes a fever, and it would not be a bad plan to look in this new direction and keep account of the lower animals which may have been in prolonged, close contact with every obscure disease, particularly the short fevers and glandular enlargements. This seems to be the direction of inquiry in the numerous short tropical diseases called three-, seven- or ten-day fevers, although it is half-suspected that some of them may be due to climatic factors. It is very evident that the parasites of all the lower animals, are becoming of vital importance to public health, and the more workers in the field the better. Most of the investigators must necessarily be salaried men, relieved from practice, but the fields they invade will depend upon the observations of practitioners. So we are really the ones who must start the ball rolling.

THE CAUSE OF THE MALARIAL PAROXYSM.

Much mystery has always surrounded the cause of the malarial paroxysm, and more hypothetical toxins have been urged as its cause. But no attempt had been made to determine the nature of the toxic agents causing the paroxysm until Wade Brown in a recent article offered experimental evidence pointing to the malarial pigment as the cause. Brown had previously shown that the pigment elaborated from the hemoglobin of the red cells by the malarial parasites was undoubtedly hematin, and now he shows that this pigment, injected into the circulation, can produce in rabbits a series of phenomena strikingly like a true paroxysm in man. The observations on rabbits were extensive and carefully controlled, but it is naturally difficult to draw final conclusions, and Brown has been most conservative in his summary. It seems to us that he has almost conclusively shown hematin to be the cause of the paroxysm.

Not the least interesting incident in this report is the psychological side. As occurs so often in original investigations, the obvious and the simple are overlooked in the search for the infinitely great. It is clear that the malarial parasite should break up hemoglobin into hematin, and that the hematin should cause the paroxysm; yet we see malaria often and stumble blindly along until the clear vision of a Brown finds the stumbling-block under our very feet.

LITERARY NOTES.

If the reader is tired of lengthy disquisitions on psychology and longs for something simple, we would refer him to William McDougall's "Psychology—The Study of Behaviour" (Henry Holt and Company,

New York). Here he will find chapters written in easy, flowing English and so devoid of redundancy that he will at times be surprised that so much solid matter can be crowded into so small a space. But by practising the latter art—this is certainly an art when one remembers the prolixity of most books on psychology—the author does not sacrifice any points of interest. The chapter that will hold the reader's attention longest is the one on The Study of Animal Behaviour, for on this topic the author seems to have expended his best efforts, not only of the literary sort but of those powers of mastery and interpretation which are his by nature, we take it, abetted though they might be by his being reader in mental philosophy at Oxford. The Home University Library has many books to its credit; but without prejudice it can be said that none is of equal worth with this book, since not only is the subject of unusual interest but the manner of treatment a worthy illustration of what scholarship really stands for in one of the leading universities of the world.

―――

The subject of heredity has been treated so often by various authors that reviewers are more or less justified in looking askance at any new effort in this direction; but, though this remark applies as a generalization, to make it applicable in special cases would be doing individual writers a deep wrong. "The Bradshaw Lecture on Some Points in Heredity" by R. Clement Lucas (Adlard and Son, London) is a case in point, for here we have a number of "items" of so unusual a nature that to class this lecture, which was delivered before the Royal College of Surgeons of England on December 6th, 1911, with the flood of books which have latterly poured from our presses would be declarative of our lack of discrimination. Having passed through the periods of Lamarckism and Weismannism with profit, the author nevertheless is no blind follower of either Lamarck or Weismann, but an observer with ideas of his own which he expounds in some instances with a proportionate degree of truth, and in other instances merely propounds lest he commit himself too deeply. The latter method is strikingly evident where he states that "it is highly probable that Nature throws out warning signals of danger in the early stages of many hereditary deformities which may be discovered if a careful search be made for minor defects among the immediate ancestors," and then goes on to cite three cases in which he has been able to trace hare-lip and cleft palate from the children to the father or mother who had an absence of the incisor tooth—hare-lip on the right side traceable to absence of the right incisor in either parent and vice versa. Of course, this sort of reasoning is getting far beyond the teachings of Weismann with his theory of the complete independence of germ-plasm and body-plasm; but in these days of platitudinous essays on heredity, striking remarks, such as are contained under the headings

of "Gradual Increase of Deformities in Succeeding Generations" and "Relation of the Absence of, or a Defective, Lateral Incisor Tooth to Hare-lip and Cleft Palate in Later Generation" in Dr. Lucas' compact and well-written essay, should give us pause, since they may be the means of opening up another chapter in the fascinating study of heredity.

———

In Mr. Peter MacEwan's "The Art of Dispensing" (Offices of *The Chemist and Druggist*, London) there are many points of interest which cannot but hold the reader's attention for a considerable space of time. Not only are the different forms in which medicaments are prescribed taken up in detail, but the manner of writing a prescription so that the risibles of a first-class chemist will not be too greatly touched is gone into for the benefit of all those well-meaning physicians who somehow overlook incompatibles and—saddest of all factors in the make-up of prescriptions—legibility. Caligraphy, for reasons which have never been satisfactorily explained by critics of the strange doings of medical men, has been deemed, it would appear, of such secondary importance that to mention it in connection with the routine work of the general practitioner could not help but be the means of introducing a subject of deprecating superfluity. But, after reading the chapters "Foreign Prescriptions" and "Autograph Prescriptions" in the book under consideration, we are made aware in no dubitable way that the matter of legible penmanship in the writing of prescriptions, while it may stamp the penman as conventionally normal, would prevent many a pharmacist from writhing in mental anguish on account of vain endeavors to decipher what apparently is Chaldaic but in reality bastard Latin adorned with a's that look like x's, o's that look like w's, and many other letters that bear no resemblance to what civilized man is supposed to put on paper. But, despite the many excellences of the chapters just mentioned and the many home thrusts dealt by the writer, we fear that, as regards manner of penmanship, the eccentricity of the majority of prescribing physicians will be just as rampant in the future as in the past, for custom has certainly been lenient to them in respect of this unenviable privilege.

———

Original articles on cookery and criticisms on books pertaining to this subject have recently been given much space in the columns of our medical journals, and in no way does the writer of these lines wish to convey the impression of his disapproval. But, of the many papers and criticisms (mostly laudatory, such is the kindly spirit to-day toward anything new and appetizing from the kitchen), how few are appealing

to the normal man who may "sin" in the direction of aspiring to be a gourmet? Of course, as all of us know or should know, the words gourmet and gourmand bear no resemblance to each other, except perhaps outwardly; but such is the "pathological" state of most of the writers on cookery in our medical journals that a sad confusion, as regards the true meaning of these words, exists in their minds, and the reader with his very limited knowledge of French fully imagines that he has been "hogging it" for years when in fact he may be on the high road to the goal desired of many but achieved by few—the state of being a gourmet. A book that will set him right in his wilderness has recently come to our desk, and, though it is not written by a medical man, it has all the good points that inhere in finesse, penetration and that verve which is peculiar only to one nation—the French. Reference is made to "Gastronomie pratique" by Ali-Bab (Ernest Flammarion, Paris), a work that is so far superior to the cookery-book which generally comes to our desk that to institute comparisons would really be an insult to the talented author, who is no less a person in real life than Henri Babinski, brother of the well-known French neurologist. Be it said here at once that this is no book for a convalescent after a siege of illness that has left him in a subnormal condition, nor is it a book that will make a deep and lasting impression on him who is so inured to cold apple-pie for breakfast that it would be a sacrilege to disturb so deep-rooted a habit; but it is a book for an apprentice who wishes to advance so that he may know what the joys of the table are. And if it were possible to do away with those weary years of apprenticeship dedicated to ill-cooked and badly-seasoned viands, would not our national stomach be the better for an early plunge into the inviting recipes as given forth by this author? It may be objected that *filets de sole, sauce homard, filets mignons, sauce madère, aux pommes de terre à la crème* and *poulet sauté au vin blanc* have not the simplicity of "steak with German fried," but as regards succulence, gustatory stimulation, and the means of bringing mental peace would any fair-minded critic fail to give the palm where it should go? Altogether we have here a book of knowledge, charm, and literary merit, the whole o'erspread by that lightness of touch and deftness which are purely Gallic: qualities which are most evident in the historical sketch—Gastronomy Across the Ages.

ORIGINAL ARTICLES.

THE RATIONALIZATION OF MENTAL MEDICINE.

By WILLIAM A. WHITE, M. D., of Washington, D. C.

In endeavoring to explain what is meant by the rationalization of mental medicine, the writer can best proceed by leading up to the present-day points of view by a brief discussion of some of the conceptions that have preceded them and from which they have developed.

Mental disease has always represented all that was mysterious and impossible of comprehension by the ordinary standards of human reasoning. In the Middle Ages all the phenomena, which are now grouped under that nondescript and misleading term insanity, were regarded as having come upon the person afflicted from outside.

The actions of the insane person were so strange, so different from others, that it was inconceivable that they could have their explanation in terms of derangement of his mental faculties. And so, in an age in which it was commonly believed that the supernatural was constantly breaking in upon the course of the natural, the explanation lay near at hand. The insane person acted as he did because he was possessed.

This belief, we see, takes no account of the individual at all, but explains the phenomena manifested as being due entirely to the operation of forces projected from without. The patient becomes, then, simply the medium through which these forces manifest themselves.

With the advance of scientific learning the view that insanity was the result of possession—of the influences of some supernatural power from without—came to be replaced by the concept of disease. Insanity was a disease of the mind.

These two ways of regarding insanity, as caused either by supernatural forces from without, good or bad as the case might be, or regarding it as due to a disease, have a certain similarity that is worth while noting. In the first instance, the devil or a witch, for example, obsessed the patient and made him act in a crazy manner. In the second instance, a disease affected the patient and was accountable for the results. And in both instances there was an end of the matter; the manifestations had been sufficiently accounted for. A something behind the symptoms is postulated in each instance to account for them.

Of course, the results of the conception of insanity as a disease worked untold benefactions for the unfortunate afflicted ones. It resulted in an entire change of attitude toward them. They were regarded as afflicted and objects of pity instead of being perhaps in league with the devil.

From the point of view of understanding the patient, however, the two views led to very much the same results, although, of course, the later view was a more open one and more accessible to reason. Their common quality was, that having traced the matter to its cause, the results were thereby sufficiently accounted for—a patient who shouted and screamed and tore up his clothes and broke the furniture did it because he was possessed by the devil, according to the first view, or because he was crazy, according to the second.

The change from the concept of an invasion by the supernatural to the concept of disease was, in the main, a change from looking without the patient to looking within the patient for an explanation of the phenomena.

The disease concept, however, led to much that was fruitless for the understanding of mental disorder when it investigated the physical symptoms, as it often did, to the practical exclusion of the mental; as if, in order to understand a cardiac disease, the principal examination should be directed to the condition of the teeth.

When, however, the mind did finally become the object of direct inquiry, psychology was dominated by faulty hypotheses. The will, the intellect, were conceived as actualities, as things that brought certain results to pass. A voluntary act was an act of the will, a judgment was an act of the intellect and so on.

It will be seen then that while the general concept of disease, like the concept of demoniacal possession, is an attempt to account for the symptoms by something back of them, so we find the same thing with the faulty concepts of psychology. In accordance with these conceptions, there are such things as will and intellect and memory, which, like disease or the devil, stand behind volitional, intellectual and memory experiences, and are thought of as accounting for the results.

Let us take an instance of a patient who persistently forgot where she put her lead pencils and see how inadequate any such conception is. Analysis disclosed the fact that the pencils were given to her by a person she disliked very much. In this case the woman is said to forget the lead pencils, which inquiry developed were given to her by a person whom she disliked. The explanation is that the lead pencils stood as symbols for the disliked person and by forgetting them she put the memory of this individual out of her mind and thus saved herself from a disagreeable experience. The old psychology would say that here was a defect of memory, and let it go at that, thus corollating it with experiences which seem to be similar upon the surface; for example, the same explanation would be advanced as to why you or I

should forget where we laid our pencil when we were busy at our desk. But, if we examine the two instances, we will see not only the inadequacy of the memory concept, but the complete difference in the two phenomena. You or I are busy working at our desks, perhaps correcting examination papers, and the pencil that a moment before we picked up to use is laid down in a moment of absent-mindedness while our attention is busily fixed upon our task and then when we wish it again we cannot remember where we put it. What has happened in this case is merely that the attention has been so vigorously at focus in one direction, and that direction not the direction of the pencil, that the laying down of the pencil was not sufficiently paid attention to to make enough of an impression so that it could be recalled. According to the memory concept there is only a single element that goes to make up memory which has been involved—namely, impressibility, and really not impressibility strictly speaking, because there was no defect in the possibility to impress the writer's mind or yours. The fact simply was that because the attention was drafted in another direction the impression was not made. The difficulty is really due to a defect of attention. It is as if an analysis of the excretions should show a very great lack in the solid matter excreted and a conclusion were reached that there was a serious disorder of nutrition, when in fact the real explanation lay in the fact that the individual had not taken food. Now let us take up the case of the woman who forgets the pencils and see about that occurrence. The minute we go into it we see that there is absolutely no similarity between this instance and the other. There is no defect of impressibility. The pencil not only made an impression upon her, but it was a very distinct impression, as instanced by the fact that it was a very painful one. The forgetting, so-called in this instance, then, is not due to the inability of the person to recall the pencil to mind, but it is an active process based upon the disinclination of the individual to think of the pencil, and so instead of being a disorder of memory in the sense of defect of impressibility or lack of power of recollection or what not, it is better described in terms of the reaction of the patient. The forgetting of the pencil in her case is seen to be a special way in which the individual relates herself to a definite situation. And so the two occurrences that from the surface appear so much alike, and in the terms of the old faculty psychology would both have been described in the same way as due to defect of memory, are seen to be absolutely and entirely different in all their details.

While all of us have advanced beyond the demoniacal possession stage of development in our concepts, many of us are yet willing to rest in the belief of a hypothetical disease entity that gets into the body somehow and produces the results—as if mania were due to a disease-mania, entering into the patient and in some quite mysterious way

bringing about the symptoms—and still more of us are willing to rest our explanation in some sort of disorder of a hypothetical faculty, such as the will or the intellect, or of some state of the individual, such as degeneracy, criminality, moral defect.

This method of procedure, for the explanation of phenomena, is simple and familiar. Science proceeds in its explanation of phenomena. It goes a certain distance, beyond which progress seems impossible. At this point metaphysic steps in and creates a hypothetical noumenon for what science leaves unexplained. Then, in the course of progress, as science forges ahead, the hypothetical recedes.

We are beginning nowadays, however, to go at the whole matter from a somewhat different point of view. Hypotheses are essential to scientific progress, but may, and frequently do, as in the foregoing case, have a tendency to interfere with that progress when they are retained beyond the period of their usefulness. They can serve their maximum usefulness and do the least harm when consciously and intelligently employed. That is what science endeavors to do. To make the hypothesis merely a tool to be discarded when no longer of use, or to be substituted when some other tool will serve better. In this way the hypothesis need not have that blinding effect upon progress that the concept of disease has exercised for a long time upon the under standing of mental disorder.

Such a change in the attitude of approach to the problem of disease has been coming about in other departments of medicine. The writer has before him, on his desk, Krehl's work on pathological physiology. He sets forth with a good deal of emphasis the necessity for comparative studies. That which is normal for one species is abnormal for another, that which is normal for one man even may be abnormal for another, and that in disease the processes are the same as in health and can be reduced to terms of the chemistry and morphology of the cell or of the action of the environment upon the cell. What we may call the normal is, after all, only the usual.

This conception of disease as being the expression of unusual relations in structure, or unusual relations between the individual and the environment at some point, is the sort of conception that is now dominating mental medicine and which has been productive of such brilliant results in the explanation of mental phenomena. It is equally potent for good in this, as in the other fields of medicine, because it does not excuse resting at any unexplained point on the assumption of some hypothetical thing that accounts for it all. Let us formulate this conception a little more definitely for mental pathology and see where it leads us.

In the first place, we must constantly bear in mind that we are born into this world to all intents and purposes, without minds, and that the stuff that mind is made of is the result of the thousands and hun-

dreds of thousands of sensory experiences streaming into the brain from the outside world and from the various portions of the body. These sensory experiences are received and grouped, classified and re-acted to. They are, to put it a little differently, received, assimilated, redistributed, and then finally condition the actions of the individual. The writer realizes that he has said a great deal in a very few words and that perhaps he may be confusing; but the essential thing to re-member is that we start out with nothing, that the stuff of which our mind is made is constantly being added to every moment of our life by the receipt of new material, and that therefore, at any instant in our lives, any act that we may do, can only be the end-product of everything that has gone before. Any human activity can only be what it is be-cause of all that has preceded, and therefore, considering the infinite complexities of life, it is inconceivable that any two human beings should be absolutely alike or that they should be able at any given moment to react in mathematically the same way to the same situation.

Of course, naturally, because the civilization and social condition in which we live is, broadly speaking, practically the same in its effects upon all people, and the people who constitute it are brought up in practically the same sort of way, we get a certain degree of uniformity in re-sults, a uniformity which, however, quickly disappears when we en-deavor to compare people of different races and of different social con-ditions.

We think, then, of the normal individual, or to define the normal as the usual, we think of the usual individual as being the one who in general reacts to situations along certain fairly well-defined lines, where-as we think of the abnormal individual as one who, under given con-ditions, does strange and unusual things, things that could not be pre-dicted, or appear to have no explanation. Instead of endeavoring to explain the unusual by introducing the conception of disease, we have only to think of it as being due to an unusual quality of mental material, or to an unusual association or distribution of that material.

The fundamental thing that the writer wants to get at by these rather difficult explanations is that no matter what an individual may do or say or think, there is some very good reason which adequately ac-counts for it; that we no longer look upon individuals, either normal or abnormal, as doing things without reason, but that we believe that every single act has its efficient cause. It only remains to fathom the mind and find the cause; and if we cannot find it we still believe that of necessity it must be there. A simple illustration will show pre-cisely what the writer means. A patient, among other symptoms, had auditory hallucinations. The voices told him that he did not take enough money home from his wages. This means nothing on the face of it, but questioning elicited the fact that following a mishap with his work he had taken an additional drink or so each day. As he

was in the habit of bringing all his wages home to his wife except what little went for car-fare and lunch, it will be seen that the voices went right to the root of the difficulty. The patient was suffering from an alcoholic psychosis.

We are ceasing from regarding the delusion as the disease. The delusion is more nearly comparable to scar-tissue in the realm of the physical than it is to disease. It is the result of an effort on the part of the patient to adjust to certain conditions—often intolerable. For example, long term prisoners not infrequently develop the idea that a pardon has been granted them and are thus better able to put up with the conditions of confinement. The same mechanism was at play in a prisoner who was under sentence of death for murder. The murdered person was seen in an halluncinatory experience, and so the possibility of the near-coming execution was rendered doubtful to her mind and life became thereby more tolerable.

This obtains even in the deliria where we are accustomed to a productivity that has all the outward signs of extreme incoherence. The writer recently went over a stenogram that had been taken during such an experience with a patient after her recovery from a drug delirium. She was able quite fully to supplement the broken sentences and explain the meaning of all the apparently incoherent things she had said.

And so no matter how irrational an act may appear, or in fact no matter how impossible it may be for the patients themselves to explain it, as is frequently the case, it must have had its efficient cause. It is precisely the same with situations that we see about us. We hear, for example, one end of a telephone conversation. It sounds perfectly senseless, or, if we think we divine the meaning, we may learn when we know the whole conversation that we are entirely wrong. It is necessary to get the associations, to know what the other end of the conversation was, in order that the whole situation may receive its explanation. And so when we see a patient doing strange things, or hear him making strange remarks, they seem strange to us merely because we do not know the other end of the association. We do not know what is going on in the patient's mind, and as the patient very often cannot tell us, it is easy to jump at the conclusion of incoherence, and the like.

In advanced conditions of dementia præcox, however, we find not only that the sayings and doings of the patient are not understandable from mere observation, but that the patient is inaccessible to analysis, so that the whole condition appears to be one of disintegration. It makes no difference, however, how severe the grade of disintegration may be, the fragments are fragments of things that were there before, and here and there, from a mass of irrational incoherent jargon, a fragment will appear that we seem to recognize. One of the writer's patients, not long ago, who was very greatly dilapidated and who spoke very little that had any apparent sense, in the midst of his in-

coherent talk made several remarks to the effect that he had had something to do with his sister when he was a little boy, that he had not told the priest about it, that his shadow was heavy and black, and that he could see the devil in it. It is fairly evident that such remarks point to a painful event in the patient's life and something that has harassed him through the years. It is probable that he had incestuous relations with his sister, that he did not confess it to the priest, and that his black and heavy shadow with the figure of the devil in it is symbolical of his sin haunting him. This may not be, of course, an accurate expression of what has happened to this man, but the writer does not believe it is very far removed from that explanation.

An illustration will show further what the writer means. Imagine a china-shop filled with all manner of dishes, pitchers, plates, cups, saucers, bowls, etc., and imagine that something happens to produce the wreckage of the shop. When we contemplate the destruction, we see everywhere lying about fragments of broken crockery, the fragments in many instances are unrecognizable, that is, we cannot tell from looking at them what sort of dish they may have been broken from. Other fragments are larger, and it is fairly evident that one is a part of a cup because it has a handle attached, that another is a part of a bowl because of its shape, etc., etc., and still in other places there will be whole dishes that have not been broken. And so in the disintegrated mind we find fragments of all sorts and descriptions—some of them we may suspect the nature of, others show plainly to what they belonged, and still other regions of the mind here and there seem to have escaped destruction. But no matter how great the wreckage, no matter how badly things are broken up, the fragments are fragments of the things that were there before. The man, whose case the writer has just cited, was incoherent to the last degree, and in talking with him it was impossible to get very much that had any meaning. Here and there is a reference to previous institutions in which he had been a patient, and finally the remark cited, which very plainly showed the nature of the thing to which it belonged.

And so we might elaborate this example of the china-shop to suit all sorts of conditions. We might have a department store in which there was a department of chinaware, one of cut glass ware, another of silverware, another of dry goods, another of perfumery, etc., and we might have the wreckage take place in only one of these departments and thereby typify a circumscribed psychosis. It might take place in many or in all of them, or the wreckage again might be of such a character that the fragments from one department were mixed with those of another. And then again the wreckage might be due to the bits of ware being in unstable equilibrium on the shelves, and the elevator that was installed yesterday and was running for the first time jars the building in such a manner that one or two pieces falling down

carry others with them, and so we have an endogenous psychosis like dementia præcox, and the individual breaks down by the stresses incident to physiological changes such as puberty and adolescence. Or the wreckage might be due to something introduced from outside. The building might catch on fire, and the fire sweeping through the place cause destruction. This would typify the exogenous type of psychosis which is due to the introduction of infection from without. But no matter which happens, when we come to view the wreckage we find that it consists of fragments of the things that were there before.

It will be seen from the foregoing illustrations that mental facts are subject to examination as the logical outcome of other preceding mental facts. Any given mental state must be conceived as the natural and necessary result of mental states that have gone before, and its explanation must be sought in the nature of those mental states.

This does not mean that we have discarded hypotheses. Hypotheses are still necessary and will always be necessary to help us picture how the things come about that we do not understand.

For example, why do certain persons develop hysteria, and others, under what appear to be precisely similar stress, develop dementia præcox? Why does one alcoholic develop a nephritis, another an hepatic cirrhosis, and a third a polyneuritis with perhaps a Korsakow's psychosis? We do not know. What we call disease is the result of the effects upon the organism of destructive and disintegrating forces. Different persons react to such forces in different ways, and in the realm of the psychoses we say the difference is due to differences in character, and speak of the psychoses as modes of reaction of certain types of character.

Here, of course, is an hypothesis: the hypothesis of character types as controlling the particular form in which the mental symptoms will manifest themselves. But it is a fluid hypothesis that permits of research to determine the activating elements in the character, and which directs to the consideration of mental facts a rationalistic attitude that will only be satisfied with an explanation that is an explanation in fact, and which does not leave the facts in the air.

THE WASSERMANN REACTION IN DISEASES OTHER THAN SYPHILIS.

By John W. Marchildon, B. S., M. D.,

Assistant Professor of Bacteriology in St. Louis University Medical School.

A great deal of stress should be laid upon the result of the Wassermann reaction in diseases other than syphilis. One may readily understand that if the Wassermann reaction is to be of diagnostic value for syphilis it must be characteristic for it. Therefore, the Wassermann test has been tried out carefully on as great a number of patients, and in as great a variety of diseases, as possible, by many investigators for the purpose of control.

Very soon, following the giving out of the technique of the Wassermann test for syphilis, came the report that this test was not really specific for syphilis, but that also the blood-serum of scarlet fever patients gave positive Wassermann reactions. This was the work of Much and Eichelberg[1] in the Hamburg Krankenhaus. They reported that in 25 cases of scarlet fever, 10 cases gave positive Wassermann reactions. Following this, Much[2] reported 45 positive Wassermann reactions in 100 cases of scarlet fever. However, these authors used from 0.3 to 0.4 c.cm. of human serum in each reaction, which is greater than is used in the typical Wassermann test. The maximum dose, which has always been recommended by Wassermann, is 0.2 c.cm. of the patient's serum. Immediately following these reports Boas and Hauge[3] examined the serum of 61 cases of scarlet fever, making a typical Wassermann reaction, using only 0.2 c.cm. of serum, and in all these cases the reaction was negative. The serum was taken from cases showing all the stages of scarlet fever. One case, a girl nine years of age with scarlet fever, that had no symptoms of congenital or acquired syphilis, gave a positive reaction, but the examination two weeks later gave a negative reaction. No explanation was given for this phenomenon. Bruck and Cohn,[4] in 28 cases, found positive reactions in 8 cases, in the height of the disease. However, they found that the serum of scarlet fever patients did not react positively with all extracts but only with some extracts; sometimes with one and sometimes with another; whereas the serum of syphilitic patients used for comparison gave positive reactions with all extracts. Jaworski and Lapinski[5] found 3 cases of doubtful positive reactions in scarlet fever. In the writer's experience with cases of scarlet fever the reaction has always been negative. It is readily seen that if one uses several extracts for compar-

ison, the number of positive results in diseases other than syphilis is greater than is met with in the routine practice of making serum tests. One cannot judge, therefore, how many of these cases would react positively had the Wassermann reaction been properly carried out. From the results of various workers one may conclude that during the course of scarlet fever a positive reaction may occur for a short time with certain cases. The reaction, however, is fleeting, and the practical importance of the Wassermann reaction is in no way lessened in value, because such cases never come up in the diagnosis of syphilis.

Following the reports from the Hamburg Krankenhaus, that the Wassermann reaction would sometimes occur in scarlet fever, were the reports of Weil and Braun[6] and also of Elias, Neubauer, Porges and Salomon,[7] that the Wassermann test was sometimes positive in tuberculosis. In 21 cases of pulmonary tuberculosis Weil and Braun found 2 cases that gave positive results. Elias, Neubauer, Porges and Salomon, in 25 cases, found positive reactions in 5 cases. However, they stated that these reactions would hardly be confused with those given by a syphilitic serum. Boas,[8] in 49 cases of extensive tuberculosis, found 46 cases giving a negative reaction and 3 cases reacting positively. In these 3 cases, however, not only could syphilis not be excluded, but undoubtedly was present in latent form. In blood obtained at autopsy in the writer's own series, he found two specimens reacting positively, which were cases of extensive, widespread tuberculosis. In these cases there was nothing during life to lead one to suspect that syphilis was present. In one patient of his series, with bone tuberculosis, giving a positive reaction, the clinical diagnosis was later changed to syphilis, and the lesions healed under antisyphilitic treatment. Accordingly, in very extensive tuberculosis, especially in cases which go to autopsy, a weak positive Wassermann reaction may sometimes occur, but the degree of such a reaction would hardly be confused with that obtained with the serum of a syphilitic patient, and again, with such patients the question of syphilis never enters the diagnosis. It is of so little importance that Boas even concludes that a positive Wassermann reaction does not occur during life in tuberculosis.

Weil and Braun made Wassermann reactions in 20 cases of typhoid fever, and of these found 3 cases which gave positive tests. This was not confirmed by Bauer and Meier[9] who, in 26 cases of typhoid, obtained a negative reaction in all. In the writer's work, upon the blood at autopsy, with Fleischmann, of Berlin, he had 2 cases of typhoid that gave positive reactions. However, these cases were severe, going to autopsy from perforation and septicemia. One may conclude that in typhoid fever cases during life, the Wassermann test is practically always negative.

Many writers such as Much, Eichelberg, Michaelis, Lesser, and others have found positive reactions in malaria. Boehm[10] had a case of ma-

laria giving a positive reaction, but found that the reaction, after the recovery of the patient, became negative. Jaworski and Lapinski[11] found a doubtful positive reaction in a case of malaria, in which the history and physical findings of syphilis were not clear, but, that in cases in which syphilis could be excluded, a positive reaction was never found. Tschiknawerow[12] found a negative reaction in this disease. The Wassermann tests made by Boas were also negative. In the writer's experience with malaria he has found the reaction always negative. One may, therefore, conclude that in malaria the reaction is, for all practical purposes, negative.

In 14 cases of malignant tumors Weil and Braun found a positive Wassermann reaction in 4 cases. Elias, Neubauer, Porges and Salomon, as well as Simon,[13] Schenck[14] and others, have reported also positive reactions in extensive carcinoma with metastases. They emphasize the fact, however, that these cases were very severe, and, as a rule, they were old patients in whom it is very difficult to exclude a previous syphilitic infection. Newmark[15] reports the occurrence of a positive Wassermann reaction in 2 cases of non-specific tumor of the nervous system. The first patient was a woman fifty-three years of age with a diagnosis of tumor cerebri. The Wassermann test was positive and at autopsy the patient had a gliosarcoma. There was also present a small carcinoma of the breast. The cerebrospinal fluid also gave a positive Wassermann test. The second was that of a woman forty-five years of age. The blood-serum and also the cerebrospinal fluid reacted positively. An intradural psammoma was removed by surgical operation. In these 2 cases the Wassermann reaction was made by competent men, as also was the histological diagnosis of the tumors. Oppenheim[16] found a positive Wassermann reaction in a patient with a fibroma situated in the cerebello-pontile angle. A similar case of tumor of the brain was reported by Marburg as giving a positive Wassermann test. Cohan[17] also reports a case of tumor of the brain reacting positively. In the foregoing cases of Oppenheim and Cohan, syphilis could be absolutely excluded. Forster[18] had a patient who showed symptoms of tumor of the spinal cord in whom the Wassermann reaction was positive. A surgical operation was done, and an endothelioma was removed. The subsequent course of the case, however, led Forster to believe that the patient had syphilis also. Bauer and Meier, after extensive, careful investigations of patients with malignant new growths, were not able to confirm the work of previous reports. They were not able to find a single case of malignant tumor that gave a positive Wassermann reaction. The results of Bauer and Meier were confirmed by Boas who examined the blood-serum of 32 cases of tumors. They were patients with tumors of great variety, sarcoma as well as carcinoma, having extensive metastases and a general cachexia. The histological diagnosis confirmed the clinical diagnosis of malignant tumor. In no case was

a positive Wassermann reaction given. From these recent observations one is justified in concluding that, in malignant growths, the Wassermann reaction is negative.

The influence of icterus on the Wassermann test is important. Kaplan[19] early reported that blood-serum which contained bile reacted positively, but did not react to the same degree as syphilitic serum. Scherdemandel[20] pointed out that the serum of an icteric patient, containing a great deal of bile, could not be used in making Wassermann tests. Bar and Dauney[21] are quoted by several writers as holding the view that icterus can give a positive Wassermann reaction. For this reason one should not make the test on a newborn icteric child, as a positive reaction might easily result, which need not necessarily point to congenital syphilis. This is incorrect, as Bar and Dauney, on the contrary, found that the hemolysis in sera of icteric children took place a little later than in non-icteric children; the final result, however, always being the same, that is, total hemolysis. As a theoretical possibility they suggested that such icteric serum can occasionally give a positive reaction, but they never witnessed a case. Boas examined 14 cases, adults as well as children, and found that not one of them reacted positively, nor could he confirm the work of previous observers that icteric serum delayed hemolysis more than the serum of many other diseases. Accordingly, one can safely say that patients with icterus do not give positive Wassermann reactions.

Dreyer[22] and Schnitter[23] reported the presence of a positive Wassermann test in cases of lead poisoning. In general, the cases gave no history or showed no signs of syphilis, so they concluded, that occasionally the blood-serum of a patient with lead poisoning gives a positive Wassermann test, depending upon the length of time and the severity of the disease. This, however, was not confirmed by Perussia,[24] who examined the blood-serum of several cases with lead poisoning, and also the serum of artificially poisoned rabbits. In his work every examination showed negative results.

Wolfsohn[25] and later Reicher[26] reported that immediately after anesthesia a positive Wassermann reaction was given, and that the longer the narcosis was continued the stronger would be the reaction produced. After a few days the reaction became negative. Cherry[27] could not confirm the occurrence of a positive Wassermann reaction following anesthesia. That it might be produced occasionally he would not deny. That chloroform may bind complement is true, but it is not present in the blood during life in sufficient quantity to affect appreciably the Wassermann test. During anesthesia, long before the serum of a patient could contain enough chloroform to produce a positive Wassermann reaction, death would occur. It has been suggested that chloroform may have a destructive action on the liver which is very rich in lipoid substances, and that the presence of these substances which are set

free in the serum, if in a large amount, would bind complement. In 30 cases examined by Boas in various stages of anesthesia, the reaction was always negative. That a positive Wassermann reaction is produced in anesthesia has not been confirmed.

In 15 cases of dementia præcox examined by Roubinowitsch and Levaditi,[28] 3 cases gave positive reactions. Nonne and Eichelberg[29] found a few positive reactions in cases of multiple sclerosis, pseudotabes, alcoholica, epilepsy and tumor cerebri. Boas examined 34 cases, all of which reacted negatively. The writer's series of 6 cases gave 3 positive reactions. From his experience a positive reaction is sometimes given in cases of dementia præcox. These cases were under the care of Dr. W. W. Graves at the Alexian Brothers' Hospital, St. Louis. Those giving positive reactions were treated for syphilis.

A large number of authors reported positive reaction in leprosy, among them Eitner,[30] Wechselmann,[31] and Meier,[32] Jundell Almvist and Sandmann, who found that the tubercular form of leprosy frequently reacted positively, while the anesthetic form gave comparatively few positive reactions. Boas examined 2 cases of anesthetic leprosy, both of which reacted negatively. The writer has made Wassermann reactions in 2 cases of anesthetic leprosy in St. Louis, the reaction being negative in both.

Four cases of Hodgkin's disease, giving positive Wassermann reactions, were reported by Caan.[33] This work was not confirmed by others. Xylander[34] found that in diseases other than syphilis, where the enlargement of the lymphatic glands was general throughout the body, and in infectious diseases as sepsis and smallpox, the reaction was always negative. In the writer's series of cases, he has seen 3 cases of Hodgkin's disease during life and 2 at autopsy. The reaction was negative in all.

Elias, Neubauer, Porges and Salomon, and Weil and Braun each reported 2 cases giving positive reactions. Eichelberg[35] obtained four positive results in 7 cases. These results have not been confirmed by later workers. Eleven cases were examined by Boas. One of these had diabetic coma and died. A negative reaction was present in all. Bauer and Meier reported negative reactions in all cases in their series. The writer obtained a positive result in one case. This man gave a history of syphilitic infection twelve years previously and, upon bichloride injections, in increasing doses, the reaction became negative. The sugar rapidly decreased in amount in the urine under antisyphilitic treatment.

The first to report on cases of lobar pneumonia were Weil and Braun who found 4 of 12 cases reacting positively. In these, however, the question of syphilis being present in latent form was not excluded. In Boas's series of 48 cases, 2 cases gave positive reactions, and in both of these the clinical manifestations of syphilis were present. The writer has had experience with the blood-serum of cases of lobar pneumonia and negative results were found in all. One may conclude that in lobar pneumonia the Wassermann reaction is always negative.

Hauck[36] and also Reinhardt[37] have each reported a case giving a positive reaction. Boas examined a patient who reacted negatively. In a negro with a very extensive lupus, a patient of Dr. M. F. Engman, at the Skin and Cancer Hospital, and now in the Quarantine Hospital, St. Louis, the writer found a negative reaction.

The Wassermann reaction has been made in a great variety of other diseases. The early reports, while showing an occasional positive reaction in diseases other than syphilis, are not confirmed by the more recent investigators.

Eclampsia gravidarum.—Gross and Bunzel[38] found in 5 cases, during and after the attack, positive Wassermann reactions. Then, fourteen days after recovery, the reaction changed to negative. Boas found a negative reaction in 7 cases in which the blood was taken during or shortly after the attack, and, therefore, cannot agree with the statement of Gross and Bunzel.

Vincent's angina.—Much[39] reports a case which reacted positively and Sobernheim[40] examined a case which reacted negatively. Boas reports negative reaction in the cases he examined.

Psoriasis vulgaris.—Bruck[41] could not confirm the findings of Gjorgevic and Savnik in regard to the presence of a positive reaction in cases of psoriasis vulgaris. He found the reaction always negative.

Pernicious anemia.—Massaglia and Barbanti[42] found in a severe case of anemia pernicosa gravidarum a positive Wassermann reaction. In the writer's series of 15 cases the reaction has been negative.

Yellow atrophy.—Loehlein,[43] on examination of the blood at autopsy, found that a positive reaction was given in 2 cases of acute yellow atrophy. It was also noted that, in other cases which gave positive reactions, there was always a suspicion of syphilis being present.

Craig and Nichols[44] found that in patients, who had taken large quantities of alcoholic drinks, the Wassermann reaction became changed from positive to negative. This negative reaction lasted from several hours to a few days.

Dementia alcoholica.—Boas examined 4 cases of dementia alcoholica, 3 of which gave a negative Wassermann reaction and one reacted positively. Upon closer examination this proved to be a case of latent syphilis.

Boas reports also the following results: Of 87 cases of gonorrhea, 84 gave negative and 3 gave positive reactions. The 3 positive cases showed signs of syphilis. Of 42 cases of ulcera veneria, 41 reacted negatively and one positively. Within two weeks following this positive reaction, the patient had a violent eruption of secondary syphilis. Of 10 cases of gangrenous ulcer not one gave a positive reaction. Of 21 cases of eczema, one gave a positive reaction. This patient acknowledged having had syphilis twenty-six years before. Of 29 cases of nephritis, one gave a positive reaction. This patient, a young woman, denied hav-

ing had syphilis; however acknowledged having been *puella publica* for nine years. Of 21 cases of ventriculi, gastritis, nervous dyspepsia, etc., one reacted positively. This proved to be a case of tardy congenital syphilis.

Beri-beri.—Boehm reports positive reaction in 3 out of 5 cases. His patients are most probably seamen, among whom it is difficult to exclude latent syphilis. Boas found one case which reacted positively. Upon closer examination it was ascertained that the patient had syphilis eight years previously. Whether beri-beri gives a positive Wassermann reaction must still be considered undecided.

Boas has collected, from the literature, 1064 cases of normal individuals and patients with a great variety of diseases in which the Wassermann test was made. In these, there is only one single patient who gave a positive reaction and in whom syphilis could be excluded, and that was a case of scarlet fever. In all the other cases where a positive Wassermann reaction was obtained, a more complete examination, or the further course of the disease, showed that the patient had syphilis.

That a positive Wassermann reaction sometimes occurs in leprosy, malaria, tropical diseases, and recurrent fever cannot be excluded, although a positive Wassermann reaction is evidently not the rule in such diseases. In this climate, the unusual occurrence of such diseases would not lessen the practical use of the Wassermann test in any way. In scarlet fever a Wassermann reaction seldom occurs, if at all, and when it does, disappears rapidly and, therefore, would also have no bearing upon the practical use of the test. One may conclude that although an occasional positive Wassermann reaction may be found apart from syphilis, it must for all practical purposes be considered characteristic for this disease.

BIBLIOGRAPHY.

[1] Much and Eichelberg (*Med. Klin.*, No. 18, pp. 671-673, 1908).

[2] Much (Aertzl. Ver. Hamburg, December 15th, 1908. Ref. *Deutsch. med. Wochenschr.*, No. 15, p. 606, 1909).

[3] Boas and Hauge (*Berl. klin. Wochenschr.*, No. 34, pp. 1566-1567, 1908).

[4] Bruck and Cohn (*Berl. klin. Wochenschr.*, No. 51, pp. 2268-2269, 1908).

[5] Jaworski and Lapinski (*Wien. klin. Wochenschr.*, No. 2, 1909).

[6] Weil and Braun (*Wien. klin. Wochenschr.*, No. 26, pp. 938-940, 1908).

[7] Elias, Neubauer, Porges and Salomon (*Wien. klin. Wochenschr.*, No. 18, p. 652, 1908).

[8] Boas: Die Wassermann'sche Reaktion, pp. 51-52.

[9] Bauer and Meier (*Wien. klin. Wochenschr.*, No. 51, pp. 1765-1771, 1908).

[10] Boehm (*Muench. med. Wochenschr.*, No. 16, p. 829, 1908).

[11] Jaworski and Lapinski (*Wien. klin. Wochenschr.*, No. 42, 1909).

[12] Tschiknawerow (Ref. *Deutsch. med. Wochenschr.*, No. 31, p. 1367, 1909).

[13] Simon (*Journ. Amer. Med. Assoc.*, No. 14, pp. 1090-1092, 1909).

[14] Schenck (Ref. *Deutsch. med. Wochenschr.*, No. 51, p. 2302, 1909).

[15] Newmark (*Journ. Amer. Med. Assoc.*, Vol. 58, No. 1, p. 11, January 6th).

[16] Oppenheim (*Neurol. Zentralbl.*, p. 338, 1910).

[17] Cohan (*Neurol. Zentralbl.*, p. 668, 1910).

[18] Forster (*Neurol. Zentralbl.*, p. 697, 1910).

[19] Kaplan (*Journ. Amer. Med. Assoc.*, Vol. CXL, No. 1; p. 91, 1911).

[20] Scherdemandel (*Deutsch. Archiv fuer klin. Med.*, Bd. 101, Hf. 6, p. 482, 1911).

[21] Bar and Dauney (*Compt. rend.*, II, p. 1085, 1908).

[22] Dreyer (*Deutsch. med. Wochenschr.*, p. 786, 1911).

[23] Schnitter (*Deutsch. med. Wochenschr.*, p. 1032, 1911).

[24] Perussia (*Deutsch. med. Wochenschr.*, p. 1559, 1911).

[25] Wolfsohn (*Deutsch. med. Wochenschr.*, No. 11, p. 505, 1910).

[26] Reicher (*Deutsch. med. Wochenschr.*, No. 13, p. 617, 1910).

[27] Cherry (*New York Med. Journ.*, February 3rd, 1912).

[28] Roubinowitsch and Levaditi (Ref. *Semaine Méd.*, No. 23, p. 276, 1909).

[29] Nonne and Eichelberg (*Archiv fuer Psych.*, p. 433, 1908).

[30] Eitner (*Wien. klin. Wochenschr.*, No. 51, pp. 1555-1557, 1906).

[31] Wechselmann (*Deutsch. med. Wochenschr.*, No. 31, pp. 1340-1342, 1908).

[32] Meier (*Zentralbl. fuer inn. Med.*, No. 48, pp. 1181-1188, 1908).

[33] Caan (*Muench. med. Wochenschr.*, No. 19, p. 1002, 1910).

[34] Xylander (*Zentralbl. fuer Bakter.*, Abt. 1, Orig. Bd. 51, Hf. 3, p. 290, 1909).

[35] Eichelberg (Ref. *Deutsch. med. Wochenschr.*, No. 27, p. 1211, 1909).

[36] Hauck (*Muench. med. Wochenschr.*, No. 25, pp. 1265-1268, 1909).

[37] Reinhardt (*Berl. klin. Wochenschr.*, No. 43, p. 1954, 1909).

[38] Gross and Bunzel (*Wien. klin. Wochenschr.*, No. 18, pp. 647-650, 1908).

[39] Much (*Med. Klinik*, Nos. 28 and 29, 1908).

[40] Sobernheim (*Archiv fuer Laryngol.*, Bd. 21, Hf. 3, p. 504, 1909).

[41] Bruck (*Wien. klin. Wochenschr.*, No. 19, p. 704, 1910).

[21] Massaglia and Barbanti (Soc. med. Chir. di Modena, d. 18, II, 1910; ref. *Corriere Sanit*, M. 14, p. 220, 1910).

[43] Loehlein (*Fol. Serologic.*, Bd. 4, p. 227, 1910).

[44] Craig and Nichols (*Journ. Amer. Med. Assoc.*, Vol. LVIII, No. 6, p. 474, 1911).

REPORT OF A CASE OF PRIMARY CARCINOMA OF THE LUNG.

By R. T. GILCHRIST, S. B., M. D., of Wauwatosa, Wis.,

Assistant Pathologist, Milwaukee County Hospital, Wauwatosa.

Primary carcinoma of the lung is a condition seldom recognized clinic· ally and is infrequently found at autopsy. Of 30,269 autopsy reports which were examined by Reinhardt,[1] Fuchs,[2] and Paessler,[3] this condition had been found twenty-nine times. The following case which shows several interesting features was observed in the wards and pathological laboratory of the Milwaukee County Hospital:—

M. M., Hosp. No. 8881, laborer, white, æt. sixty-four, entered the Milwaukee County Hospital on December 10th, 1910, complaining of weakness and pain in the upper left chest. The family history was negative. He had had gonorrhea at the age of thirty-four, but denied syphilis. He had suffered from an attack of articular rheumatism at the age of fifty-seven and had a second attack a few months before entering the hospital. Beginning about November 1st, 1910, he had experienced pain and swelling in the upper left side of the chest accompanied by loss of weight, loss of appetite, inability to sleep, slight cough, and expectoration of mucopurulent material. There had been no chills, sweats, nor fever. The pain had not been very severe, was not influenced by respiration, but was made much worse by moving about. The physical examination upon entrance was as follows: The patient is an emaciated white man, of medium stature, with dry skin and palpable arteries. The pupils are equal and react to light and accommodation. The cervical lymph-glands are not enlarged, the thyroid gland is of normal size, and there is no tracheal tug. The chest is symmetrical except for a bulging in the left infraclavicular region, the tumor mass extending from above the first rib down to the third and from the left sternal border to the midclavicular line. The mass is of firm consistence, slightly elastic, intimately connected with the ribs, and slightly tender. The skin and pectoral muscles are freely movable over the swelling. There is no pulsation, no discoloration of the skin, and no change of temperature. The percussion note over the tumor is resonant. The breath-sounds at the apices are slightly harsh and a few piping râles are heard over the front of the chest. The area of cardiac dullness extends 10 cm. to the left of the midsternal line and 4.5 cm. to the right in the third interspace. There is a systolic blow at the apex, and the pulmonic second sound is slightly accentuated. Posteriorly, the physical findings in the chest are negative.

The area of liver dullness extends from the sixth interspace to a point 5 cm. below the costal border in the mammary line. There is no splenic enlargement. No masses are palpable in the abdomen. There is an incomplete inguinal hernia on the right side and slight enlargement of the inguinal lymph-glands. The testicles are normal. The examination of the prostate is negative. The deep reflexes are normal and active. Repeated examination of the urine showed a specific gravity of from 1024 to 1028, a trace of albumin, no casts, no albumose, and no sugar. The chemical test for blood was positive once.

While in the hospital, the patient was constantly in bed on account of his weakness, with poor appetite and constipation. There was a moderate cough together with expectoration of a frothy mucopurulent sputum. Repeated examination of the sputum revealed no tubercle bacilli and no blood. There was no reaction to the injection of tuberculin. The Noguchi test was found positive. A fluoroscopic examination showed the tumor mass continuous with the left border of the sternum, obscuring the anterior ends of the second and third ribs, denser than the ribs or sternum, and apparently lying in the chest wall. During his stay in the hospital, the patient steadily grew weaker, emaciation increased, the tumor mass increased in size and became more nodular. A second hard nodular mass appeared at the sixth right costochondral articulation. Death from exhaustion occurred forty-one days after entering the hospital. An autopsy was performed three days later.

Anatomical Diagnosis.—Primary carcinoma of left lung, metastases to ribs, kidneys, mesenteric glands, adrenals, heart muscle and omentum; fatty liver, arteriosclerotic kidney, fibrous myocarditis, incomplete inguinal hernia.

The body is that of an emaciated white male, apparently sixty-five years of age, length 165 cm., rigor mortis not present. Upon the upper one-fourth of the left chest is a nodular bulging mass almost the size of a fist, of dense consistence, and firmly fixed upon the ribs beneath. The skin and pectoral muscles are freely movable over it. Between the fifth and sixth costochrondral junctions on the right side is a mass the size of a walnut situated beneath the skin. Upon dissecting the skin and pectoral muscles from the larger mass, it is found to lie above, behind, and surrounding the first, second, and third ribs, just to the left of the sternum and extending toward the axilla for a distance of 20 cm. At the third costochrondral articulation, the tumor involves the rib itself, and, upon sectioning parallel to the long axis of the rib, spicules of bone are felt. The mass is definitely encapsulated by a process of fibrous tissue which consists of the reflected periosteum of the ribs. Except for the area from which the tumor mass has been separated, the pleura of the left lung is smooth and glistening. The organ weighs 850 grm. The anterior surface of the upper lobe is bare of pleura over an area measuring 5 by 5 cm. Beneath this area there is consolidation of the

upper lobe by a mass of firm consistence the size of an orange, which extends to the hilus, so that only the margins of the upper lobe are air-containing. The lower lobe is unchanged.

The cut surface of the tumor is firm, of a yellowish color, coarsely lobulated, and contains pink depressed areas. When the cut surface is scraped or the tissue compressed, a yellow-white fluid resembling pus is obtained. The right lung weighs 500 grm. and is unchanged except for two calcified scars the size of dimes in the pleura near the apex. At the hilus of both lungs are calcified lymph-glands. The heart weighs 340 grm. The muscle is soft and flabby, the valves unchanged, and the chambers not dilated. In the upper portion of the left ventricular wall are two masses the size of hickory nuts, the one directly anterior, the other directly posterior. These masses lie within the wall and are not visible upon the external surface of the heart. The cut surface of these masses is of the same gross structure as that of the infiltrating mass in the lung. The peritoneum is unchanged. In the mesentery near the ileocecal valve is a hard mass the size of a walnut. In the gastrocolic omentum is a similar mass of smaller size. The mucosa of esophagus, stomach and intestines is unchanged. The prostate is not enlarged but is rather firm. The liver contains no nodules and, except for fatty degeneration, is unchanged. In the upper poles of both kidneys are tumor nodules the size of cherries. Surrounding both adrenals are masses of tumor tissue and enlarged lymph-glands. The adrenal cortices are infiltrated with tumor tissue and the parenchyma drips blood. The mammary glands and thyroid are unchanged.

Microscopic Findings.—The central portion of the material composing the mass in the lung is necrotic and no cellular structures can be made out. Toward the margins of the mass the alveoli contain polymorphonuclear leucocytes, and large pale ciliated columnar epithelium which has taken the place of the pavement epithelium found in the normal alveolus. These columnar cells are in many places arranged in a single layer and rest on the alveolar septa.

The nuclei are situated at the base of the cells, and ciliæ can be made out in places. Some alveoli are entirely filled with heaped or crowded masses of epithelial cells. The crowding of the aveolar spaces is more noticeable as one passes toward the centre of the mass, and it appears as if the continued proliferation of the epithelial elements had compressed the blood-supply until necrosis resulted. All around the margin of the mass is a condition resembling pneumonia as shown by the presence of leucocytes, fibrin, and large cells containing pigment, in the alveoli. The tumor masses on the chest wall, in the myocardium, kidneys, and mesentery consist of a dense connective-tissue poor in vascular structures. In the interstices of the stroma are columns and alveoli of rather large pale epithelial cells of the columnar type, which exactly resemble those found in the tumor in the lung. In the liver there is passive congestion, fatty

degeneration, and a slight increase of connective-tissue in the perilobular spaces. Directly continuous with the adrenals are cell masses of the same microscopic structure as the tumor tissue in the lung. A portion of each adrenal is infiltrated by tumor tissue. The invading cells are larger and more vesicular than the adrenal cells. They contain a single nucleus and are arranged in alveoli, while the adrenal cells lie in columns. There is cloudy swelling and a moderate increase of connective-tissue in the heart muscle. There is a slight increase of connective-tissue in the kidneys and a moderate thickening of the renal vessels. The prostatic ducts contain many corpora amylacea. Except for some areas of round-cell infiltration, the prostate is unchanged. The mammary glands and thyroid show no change.

Ziegler[4] recognizes two varieties of primary malignant disease of the lung, according to whether the process originates from the columnar cells lining the bronchi, or from the squamous cells lining the alveoli. Adami[5] thinks that the process may at times originate from the mucous glands of the bronchi. Paessler, in a careful review of the records of 74 cases, found the cylindrical type twenty-four times, the squamous eight times, and various transitional types seven times. Paessler also found, that in only 11 of the 74 cases no metastases were present, which is probably due to the ease with which the tumor cells pass through the thin-walled vessels in the lung and thus gain entrance to the blood-stream. A feature of interest in this case is the presence of metastatic nodules in the myocardium. Hirschfelder[6] believes that secondary growths in the heart muscle are most commonly of carcinomatous origin, and quotes Thorel who encountered myocardial metastases six times in 3,000 autopsies. The primary growth in all cases was carcinoma.

The diagnosis of this condition is seldom possible except upon the post-mortem table. Demorest[7] reports a case in which the diagnosis was made by the examination of a fragment of expectorated tumor tissue. The presence of a bloody pleural effusion has been suggested as a diagnostic point. In reviewing the literature of carcinoma with metastases to lung tissue, Warfield[8] found that a bloody pleural effusion is found only in about 12 per cent. of cases. The same finding may be experienced in tuberculosis of the pleura and in chronic nephritis. Several writers mention the occurrence of a prune-juice expectoration, which, however, is seldom met. Emaciation is not characteristic. Persons, who at autopsy are found to have large lung cancer, do not show the cachexia so characteristic of malignant disease elsewhere in the body. The most constant symptoms are intense dyspnea and paroxysms of cough. The conditions from which primary malignant disease of the lung must be differentiated are pulmonary tuberculosis, mediastinal tumor, aneurysm, gumma of the lung, and metastases from carcinoma elsewhere in the body. Our patient, curiously enough, was not greatly troubled by a cough nor was he dyspneic. He suffered very little from pain considering that the process extensively involved the bony wall of the chest.

The microscopic picture shows that we are dealing with a carcinoma; and since careful examination fails to reveal any other primary seat of growth, the process must have been primary in the lung. The tumor cells exactly resemble the ciliated columnar epithelium of the smaller bronchi. It seems probable that the tumor took its origin from the bronchial epithelium near the hilus of the lung, and by direct extension involved the anterior chest wall. Diagnosis, ante-mortem, was impossible. The positive Noguchi test suggested a gumma of the chest wall. The well-marked resonance of the tumor was taken to indicate that the lung beneath was probably not involved. The absence of a pleural effusion directed attention away from the pleura. Negative tests for Bence-Jones albumose indicated that we were not dealing with multiple myeloma, a diagnosis which was at one time considered most probable.

BIBLIOGRAPHY.

[1] Reinhardt (*Archiv fuer Heilkunde*, Vol. XIX, p. 369, 1878).

[2] Fuchs (Disser. Muenchen, 1886).

[3] Paessler (*Virchow's Archives*, Vol. 145, pp. 191-278, 1896).

[4] Ziegler (*Allgemeine Pathologie*, Bd. II, 715).

[5] Adami: Principles of Pathology, Vol II, p. 322.

[6] Hirschfelder: Diseases of Heart and Aorta, p. 246.

[7] Demorest (*Med. Record*, January 15th, 1904).

[8] Warfield (*Med. Record*, July 24th, 1909).

LABORATORY METHODS OF DIAGNOSIS OF TYPHOID FEVER.

By Lydia M. DeWitt, B. S., M. D., of St. Louis,
Instructor in Pathology, Washington University; Assistant City Bacteriologist,
St. Louis,

AND

Florence L. Evans, M. D., of St. Louis,
Assistant City Pathologist, St. Louis.

So long as empiricism in therapeutics ruled, the question of diagnosis of disease occupied but a minor place in the attention of physicians, but, with the advent of rationalism and the development of scientific medicine, the correct diagnosis of disease became a question of paramount importance. While some diseases can be diagnosed by clinical symptoms alone, others have so indefinite and confusing a symptomatology that the physician who relies upon it must make many and grave errors. Typhoid fever occupies a prominent place in the latter class of diseases. Its prodromal symptoms may easily point to any one of many affections. Even its typical course and fever curve lead to a late diagnosis if any can be made with accuracy, while the atypical cases are so varied as to puzzle the most skilled clinicians. McCrae states that "this disease shows so many variations in its symptoms and course that diagnosis by clinical methods may be very difficult, and may be made only at autopsy. There is no symptom or sign which is invariably present." What wonder then that clinicians are turning to the laboratories for help and demanding that they find some means of making an early and accurate diagnosis of this disease. So insistent has this demand become that the American Association of Public Health has appointed a committee to investigate the various laboratory methods of diagnosis and to report recommendations of the method or methods best suited for early diagnosis of typhoid fever.

Numerous diagnostic laboratory aids have been suggested and the medical literature of the last fifteen years teems with reports of work done along this line. These reports are so numerous and have been so well and so recently reviewed that no attempt will be made here to make any exhaustive survey of the literature on laboratory methods of diagnosis of typhoid fever. Only a few reports, bearing most intimately on the writers' own work, will be mentioned.

Probably the simplest, and certainly the most popular, method of laboratory diagnosis is that published in 1895 by Widal and usually

known as the Widal or better as the Gruber-Widal agglutination test. For this test, fresh blood-serum or dried blood may be used, and either a macroscopic or a microscopic test may be applied. The simplicity of the test quickly made it popular, and for years, and to a certain extent even to-day, this test has been regarded as the *sine qua non* for laboratory diagnosis of typhoid fever. Recent writers, however, are expressing themselves more cautiously regarding its diagnostic value. Coffin considers the Widal test as absolute and specific when positive, but attaches little value to a negative Widal. In a report on a large number of cases in which Widal tests were made at different stages of the disease, he finds 10 per cent. positive in the first four days of the disease, 28 per cent. from the fourth to the sixth day, 50 per cent. from the sixth to the eighth day, 84 per cent. from the eighth to the fifteenth day, and 95 per cent. positive from the fifteenth to the twenty-second day. McCrae states that in a long series of cases, examined at intervals throughout the disease, over 95 per cent. should give a positive reaction, and adds that the Widal reaction is of great value when a positive result is given; and that, with proper technique, this justifies the diagnosis of typhoid fever, a previous attack being excluded. But to a negative result, no great importance should be given, as shown by the number of reactions given for the first time late in the disease. Adams, however, finds the Widal test positive in only 49 per cent. of 283 cases and Troissant reports 4 fatal cases of typhoid in which a positive agglutination test could never be obtained. Stoner advances a theory to explain this non-agglutination in certain undoubted cases of typhoid fever. He states that the agglutinins formed in the patient's blood combine with certain elements of the bacterial cell, forming agglutinogen, which contains receptors of the haptophore group, which unite with the agglutinin receptors of the zymophore group to cause agglutination. But the agglutinin may degenerate forming agglutinoids and thus block agglutination.

Collins has increased the natural agglutinating power of the serum of goats and rabbits by injecting yeast, diastase, pancreatin, invertin, nuclein, mercapton, phenol, sulphur and phosphorus. She also finds that common as well as specific agglutinins are formed in the course of specific infections.

McFarland, examining the blood of typhoid patients daily throughout the course of the disease, found 10 per cent. always negative. From all of which findings, Stoner concludes that the Widal test is not absolutely specific and reliable.

In 1885 the bacillus typhosus was isolated from the blood of a typhoid fever patient, but several years passed before the blood-culture method of diagnosis was used at all extensively. Indeed, it is only within a very few years that any considerable number of reports of blood-culture diagnosis have been published, and even yet the method seems available only for hospitals and institutions which have good laboratory facilities at

hand. Coffin, in 1908, reported a considerable number of cases in which blood cultures were made at different stages of the disease; of those made in the first week, he found 94 per cent. positive; in the second week, 70 per cent. were positive, while only 54 per cent. of those made in the third week and fourth week were positive. He therefore advises blood cultures for early diagnosis. Coleman and Buxton, in 1907, made an analysis of 1602 cases in which blood cultures had been made. These cases include, in addition to their own cases, all those that had been reported up to that date. Of these 1602 cases, 1197 or 75 per cent. gave a positive result. The examinations were made at all stages of the disease and by different methods. Of 224 examinations made in the first week of the disease, 200 or 89 per cent. were positive. The earliest positive result was obtained by Widal who recovered the bacillus from the blood on the second day of the disease. 484 examinations were made in the second week, of which 353, or 73 per cent., were positive. Of 268 examinations made in the third week, 178, or 60 per cent., were positive. Of 103 examinations made in the fourth week, 39, or 38 per cent, were positive, while of 58 made later than the fourth week of the disease, only 15, or 26 per cent., were positive. They also report 55 cases in which they found typhoid bacilli in the blood before the Widal serum reaction could be obtained, 23 being in the first week, 26 in the second, and 6 in the third week. Coleman and Buxton conclude from their analysis of all these cases, first that the typhoid bacillus is present in the blood of every case of typhoid fever throughout its course, this presence representing an overflow from the lymphopoietic organs. Secondly, that the clinical picture of typhoid fever results only from infections of the lymphopoietic organs by the typhoid organism, with invasion of the blood-stream and destruction there of vast numbers of bacilli, whose endotoxins, thus liberated, cause the intoxication so marked in this disease; a conclusion which is reached by many other writers.

Cultures from the stools of typhoid fever patients have been made by numerous investigators, but success in this depends so largely upon the technique and on the media used, that results vary widely. Conradi and Drigalski, using the culture media suggested by them and now so widely used, were successful in 100 per cent. of the 50 cases reported by them. McCrae states that, with proper technique and with repeated examination, the bacilli should be found in the stools in at least 75 per cent. of the cases. Pratt, Peabody and Long believe that typhoid fever does not develop in the intestine and that most of the bacilli which find their way there are destroyed in the duodenum and jejunum; some, however, fail to be destroyed and may be recovered from the stool, especially from the hemorrhagic stool.

Bacilli have also been isolated from the urine, but not often before the end of the third week. Cultures from the rose spots usually have yielded positive results.

Adler reports 300 cases in which the spleen was punctured with positive cultures from the fluid in 95 per cent. of those made early in the disease. Other laboratory tests have been suggested as aids in the diagnosis of typhoid fever, such as a low leucocyte count, a positive diazo test early in the disease, and the methylene-blue test suggested by Russo in 1905, favorably reported as an early diagnostic aid in typhoid fever, by Rolph and Nelson in 1911. The latter is said to be positive in some cases of tuberculosis and in measles and smallpox, as well as in typhoid fever. 2-4 drops of 0.1 per cent. aqueous solution of methylene-blue is added to 4 c.cm. of fresh urine, and an emerald green color, with no hint of blue, constitutes a positive reaction.

The writers' work comprises laboratory tests on 80 cases which occurred in the St. Louis City Hospital from June 1st, 1911, to January 1st, 1912, and is stated briefly in the accompanying table.

The cases varied greatly in the severity of their clinical symptoms, as indicated in the table, and there were 18 fatal cases in the series; in only 2 cases was autopsy permitted, one of these being a child of twelve years of age who entered the hospital with a diagnosis of malaria of four weeks' duration. Two days after admission, a Widal test proved to be negative and blood culture was refused. Two days later, he died of perforation and general suppurative peritonitis. Numerous typhoid ulcers were found in the ileum, and typhoid bacilli were isolated from the bile and from the intestinal contents. The other case was a man, forty years of age, who had been sick for three weeks when he entered the hospital. Blood culture was positive three days later, or the twenty-fifth day of the disease. About ten days after entering the hospital, he developed pneumonia and died two days later. At autopsy typhoid bacilli were isolated from the lungs, from the heart-blood, from the spleen and bile.

Several of the cases were of unusual interest, and a very brief description may be permitted. Case No. 23 entered the hospital complaining of pain around the umbilicus, more severe on the right side. A diagnosis of appendicitis was made and an appendectomy done, a thickened, clubbed appendix being removed. No relief from symptoms followed, fever and pain persisted although the operation wound was clean. Eleven days later, he had a severe chill with pain in chest. Fluid was removed from chest and cultured, proving to be a pure culture of typhoid bacilli, thirty-seven days after the onset of the disease. A positive Widal test was obtained on the fifty-second day of the disease, but the blood culture was negative, none having been taken until late.

Case 48, æt. twenty-nine, was brought into the hospital in a semi-comatose condition, meningeal symptoms being prominent. Widal and blood cultures were both negative, typhoid bacilli were isolated from the urine and feces and also in pure culture from the spinal fluid and from a discharging middle ear. This patient died eleven days after admission.

TABLE 1.

Case No.	Age and Sex.	Course of Disease.	Previous Typhoid.	Widal: Day of Disease.	Blood Culture: Day of Disease.	Stool Culture: Day of Disease.	Other Cultures: Day of Disease.	Discharge or Death.
1	38 M.	Severe	No	Positive 25th day	Pure strepto-coccus. 25th day	Not made.		26th day. Died.
2	24 M.	Mild	6 years ago	Neg. to typhoid. Pos. to Para "B" 5th day.	Negative 5th day	Not made.		19th day. Recovered.
3	30 M.	Mild	No	Negative 15th day Negative 35th day Negative 40th day	Negative 15th day Negative 35th day Negative 40th day	Positive 46th day	·	110th day. Recovered.
4	19 F.	Moderate	No	Negative 19th day	Positive 19th day		From urine diplococcus catarrhalis also motile bacillus which gives characteris-tic reactions for typhoid	34th day. Recovered.
5	36 M.	Very severe	No	Negative 34th day Positive 45th day	Negative 32nd day Positive 45th day Negative 54th day	Negative 54th day		62nd day. Died.
6	23 M.	Very severe	No	Negative 16th day Positive 25th day	Negative 16th day Positive 25th day	Not made.		29th day. Died.
7	29 M.	Mild	No	Sugges-tive 11th day	Positive 11th day	Not made		13th day Improved
8	8 F.	Very mild	No	Negative 9th day Negative 14th day	Negative 9th day	Not made		20th day Recovered
9	? M.	Severe	?	Neg. ?	Pos. ?	Not made		? Died
10	28 M.	Moderate	No	Negative 12th day Negative 16th day	Positive 12th day	Positive 14th day		78th day Recovered
11	19 M.	Mild	No	Negative 6th day Sugges. 11th day	Positive 11th day	Negative 24th day		45th day Recovered
12	24 M.	Very severe	No	Positive 16th day	Positive 16th day Negative 23rd day	Positive 26th day	Urine: negative. Pus from scrotum negative for typh.	48th day Died.

TABLE I—Continued.

Case No.	Age and Sex.	Course of Disease.	Previous Typhoid.	Widal: Day of Disease.	Blood Culture: Day of Disease.	Stool Culture: Day of Disease.	Other Cultures: Day of Disease.	Discharge or Death.
13	23 M.	Mild	No	Negative 7th day	Positive 7th day	Positive 12th day		36th day Recovered
14	12 M.	Severe	No	Negative 30th day	Refused		Post-mortem: typhoid pure from bile. Colon pure from spleen. Ty. & colon pure from abd. fluid	32nd day Died Gen. Sup. Peritonitis Ulcerative enteritis c. perfora-tion
15	M.	?	?	Negative 1st week. Sugges. 2nd week. Positive 3rd week.	Positive 3rd week.	Positive 3rd week.		?
16	22 M.	Severe	No	Sugges. 7th day.	Positive 7th day	Not made		12th day Died
17	18 M.	Moderate	No	Sugges. 12th day	Positive 12th day	Negative 22nd day		51st day Recovered
18	9 M.	Severe	No	Negative 6th day	Positive 6th day	Positive 11th day		49th day Recovered
19	17 M.	Mild	No	Positive 8th day	Positive 8th day	Positive 23rd day		29th day Recovered
20	8 M.	Mild	No	Positive 15th day Positive to own organism 22nd day	Negative 15th day	Positive 22nd day	Urine: Positive 22nd day	32nd day Recovered
21	20 M.	Mild	No	Negative 9th day Negative 26th day	Positive 9th day Negative 26th day	Positive 12th day Positive 18th day Negative 29th day Negative 31st day Negative 34th day		35th day Recovered
22	21 M.	Severe	No	Sugges. 12th day	Positive 12th day	Positive 15th day		37th day Died
23	24 M.	Severe		Negative 18th day Negative 20th day Positive 42nd day	Negative 18th day Negative 42nd day	Negative 45th day Positive 48th day	1. Fluid from chest. Staphylo-cocci only. 2. Typhoid (pure)	59th day Removed from Hospital
24	45 M.	Mild	No	Positive 25th day	Negative 25th day	Negative 29th day		58th day Recovered
25	19 M.	Severe	No	Positive 22nd day Positive 25th day Positive 30th day	Positive 25th day Positive 28th day	Positive 22nd day		31st day Died

TABLE I—Continued.

Case No.	Age and Sex.	Course of Disease.	Previous Typhoid.	Widal: Day of Disease.	Blood Culture: Day of Disease.	Stool Culture: Day of Disease.	Other Cultures: Day of Disease.	Discharge or Death.
26	M.	Severe	No	Negative about 38-48 day	Positive 22nd day ?	Positive 35th day ?	Russo test Positive 30th day	108th day Recovered
27	26 M.	Mild	No	Negative 8th day Refused other	Negative 8th day Blood speci-mens	Negative 16th day Negative 30th day		Trans-ferred to surgical service for herni-otomy 8th day
29	28 M.	Severe	No	None requested during first illness. Negative 55th day	Negative 55th day	Negative 55th day		71st day Recovered
30	33 M.	Very severe	No	Negative 2nd week Positive 2nd week Positive 3rd week	Negative 2nd week Negative 4th week Negative 6th week	Negative 3rd week Negative 4th week Negative 5th week Negative 6th week	Urine Negative 6th week	Improved
31	11 M.	Moderate	No	Negative 15th day Positive 24th day	Negative 24th day	Positive 29th day Positive 37th day		38th day improved but still ill
32	24 F.	Mild		Negative 5th day	Negative 5th day Refused 2nd bld. culture	Positive 13th day		26th day Recovered
33	18 M.	Very mild	No	Negative 4th day	Negative 4th day	Negative 8th day Negative 17th day		23rd day Recovered
34	40 M.	Very severe	No	Positive 21st day	Positive 21st day	Negative 43rd day		47th day Recovered
35	11 F.	Very mild	No	Sugges. 20th day	Positive 20th day	Negative 30th day		57th day Recovered
36	16 F.	Severe	No	Positive almost 9th day	Positive 9th day Organism is some-what smaller than ty-phoid bac. and slightly acidifies milk. Negative 31st day	Positive 21st day Negative 35th day		46th day Recovered
37	36 F.	Very mild	No	Positive 16th day Negative 31st day	Negative 16th day Negative 31st day	Negative 31st day Negative 33rd day		51st day Recovered

TABLE I—Continued.

Case No.	Age and Sex.	Course of Disease.	Previous Typhoid.	Widal: Day of Disease.	Blood Culture: Day of Disease.	Stool Culture: Day of Disease.	Other Cultures: Day of Disease.	Discharge or Death.
38	9 F.	Severe	No	Sugges. 7th day Positive 1-50 dil.	Positive 7th day	Positive 10th day Positive 15th day		40th day Recovered
39	18 M.	Severe	No	Sugges. 12th day Positive 36th day	Positive 13th day Positive 36th day	Positive 17th day Positive 38th day		41st day Died
40	22 M.	Mild	No	Positive 11th day	Negative 11th day	Negative 13th day Negative 21st day Negative 35th day	Urine Negative	61st day Recovered
41	25 M.	Moderate	No	Negative 12th day Positive 29th day	Negative 12th day Negative 29th day	Negative 16th day Positive 18th day Negative 21st day		66th day Recovered
42	22 M.	Medium	No	Negative 19th day	Positive 19th day	Positive 20th day Positive 22nd day Positive 52nd day		70th day Recovered
43	16 F.	Mild	No	Negative 11th day	Negative 11th day	Negative 15th day Positive 25th day		36th day Recovered
44	26 M.	Moderate	No	Negative 22nd day Negative 29th day	Negative 22nd day Negative 29th day	Negative 22nd day Negative 39th day		72nd day Recovered
45	5 mo. M.	Severe	No	Not made	Not made	Positive 9th day	Smears from blood and spleen pulp showed numerous aestivo-autumnal malarial plas. of all types from ring forms to crescents. Marked poikilo-cytosis Numerous nucleated reds.	20th day Died

TABLE 1—CONTINUED.

Case No.	Age and Sex.	Course of Disease.	Previous Typhoid.	Widal: Day of Disease.	Blood Culture: Day of Disease.	Stool Culture: Day of Disease.	Other Cultures: Day of Disease.	Discharge or Death.
46	5 F.	Moderate	No	Not made	Not made	Bacillus which in its morphology resembles Ty. but it acidifies milk, however it forms no gas and gives a Neg. Widal reaction	Numerous crescents found in blood smears	26th day Improved
47	3 F.	Severe	No	Negative 7th day	Positive 7th day	Positive 9th day Negative 14th day	Increased lymphocytes Numerous nuclear reds. No malarial parasites found	26th day Improved
48	29 F.	Very severe	?	Negative about 11th day	Negative ? 14th day	Positive 17th day	Pos. urine. Culture 17th day. Pure Ty. from spinal fluid and from middle ear. 20th day.	Died about 19th day
49	15 F.	Mild	No	Negative 10th day	Negative 10th day Refused other blood cultures	Positive 11th day		25th day Recovered
50	37 F.	Severe	No	Negative 2nd or 3rd week	Negative 2nd week Negative 3rd week	Negative 3rd week Negative 4th week	Spinal fl. negative 3rd week. Russo's test pos. 3rd wk Urine cul. pos. 3rd wk. Spinal fld. neg. 4th wk.	Improved 6th week
51	26 F.	Very severe	No	Sugges. 29th day	Negative 21st day Negative 27th day	Positive 23rd day Positive 27th day	Cultures from breast milk. Neg. for typhoid	32nd day Recovered
52	17 M.	Mild	No	Negative 9th day Other specimens refused	Positive 9th day blood	Positive 11th day	Urine pos. 11th day	Remained in Hos. as detail

TABLE I—Continued.

Case No.	Age and Sex.	Course of Disease.	Previous Typhoid.	Widal: Day of Disease.	Blood Culture: Day of Disease.	Stool Culture: Day of Disease.	Other Cultures: Day of Disease.	Discharge or Death.
53	18 F.	Mild	No	Negative 6th day Negative 10th day	Negative 6th day Positive 10th day	Positive 10th day	Urine pos. 10th day	30th day Recovered
54	16 M.	Mild	No	Positive 24th day Refused other blood specimens	Negative 24th day			34th day Recovered
55	6 M.	Moderate	No	Negative 10th day	Positive 10th day	Positive 14th day	Spinal fld. negative	50th day Recovered
56	28 M.	Moderate	No	Negative 5th day	Positive 5th day	Negative 5th day	Russo's test positive 5th day	46th day Recovered
57	26 M.	Mild	No	Negative 17th day Sugges. 24th day	Negative 17th day Positive 24th day	Negative 17th day		74th day Recovered
58	29 M.	Moderate	No	Positive 15th day	Positive 15th day	Positive 20th day		98th day Recovered
59	25 M.	Very severe	No	Negative 10th day Negative 15th day	Negative 10th day Positive 15th day	Positive 20th day		75th day Recovered
60	25 M.	Very severe	No	Positive 20th day Positive 33rd day	Negative 12th day Negative 40th day Positive 50th day 24 hours before death	Negative 21st day Positive 48th day 3 days before death		52nd day Died
61	? M.	Moderately severe	No	Negative 10th day	Negative 10th day	Positive 15th day		Still in Hos. 88th day but nearly well
62	? M.	Moderately severe	No	Positive 13th day	Positive 13th day	Negative 14th day		Still in Hosp. 48th day. Improving
63	25 M	Very severe	No	Positive 17th day	Positive 17th day	Positive 19th day		Died 26th day
64	28 M.	Severe	No	Positive 11th day Positive 25th day	Negative 8th day Negative 25th day	Negative 12th day Negative 29th day	Pus from ear 29th day Negative	Still in Hosp. 60th day. Improving
65	M.	Very severe typhoid pneumonia developed	No	Positive 14th day	Positive 14th day	Positive 14th day	From lung postmortem Positive	Died 23rd day
66	23 M.	Moderate	No	Negative 8th day	Positive 8th day	Negative 52nd day	Urine pos. 45th day Urine neg. 52nd day	Disch. well 58th day

TABLE I—Continued.

Case No.	Age and Sex.	Course of Disease.	Previous Typhoid.	Widal: Day of Disease.	Blood Culture: Day of Disease.	Stool Culture: Day of Disease.	Other Cultures: Day of Disease.	Discharge or Death.
67	24 M.	Moderate	No	Positive 15th day	Negative 15th day	Positive 18th day		Still in Hosp. 42nd day nearly recovered
68	31 M.	Severe perforations and operations	No	Positive 14th day	Positive 14th day	Positive 14th day	Russo's test positive	Died 22nd day
69	28 F.	Mild	No	Positive 10th day	Negative 10th day	Negative 10th day Negative 17th day	Urine cult. negative 17th day	40th day Recovered
70	16 F.	Moderate	No	Negative 16th day	Negative 8th day Negative 16th day	Positive 12th day	Urine cul. negative 16th day	44th day Recovered
71	20 F.	Moderate	No	Negative 16th day Positive 21st day	Negative 16th day Positive 21st day Negative 52nd day	Positive 16th day Positive 21st day Negative 52nd day	Urine cult. negative 35th day	60th day Recovered
72	28 F.	Severe	No	Positive 30th day		Negative for typhoid but positive for paratyphoid. A on 30th day	Urine cult. negative 19th day Urine cult. gave paratyphoid A 30th day	Died on 38th day
73	30 M.	Moderately severe. Vaccine given	No	Negative 8th day	Negative 8th day Negative 15th day	Positive 19th day		Still in Hospital 70th day, but nearly recovered
74	26 M.	Moderately severe	No	Negative 13th day Positive 55th day	Negative 13th day Positive 55th day	Positive 13th day		
75	40 M.	Severe pneumonia developed	No	None taken	Positive 25th day	None taken	Postmortem cultures from lung exudate positive for typhoid 35th day	Died 35th day
76	35 M.	Moderately severe	No	None	Negative 11th day	Positive 11th day	Urine neg. 11th day	46th day Recovered
77	34 M.	Very severe	No	Negative 12th day	Positive 12th day	None	None	Died 21st day
78	26 M.	Moderate	No	Positive 24th day	Positive 24th day	Positive 24th day		75th day Recovered

TABLE I—Continued.

Case No.	Age and Sex.	Course of Disease.	Previous Typhoid.	Widal: Day of Disease.	Blood Culture: Day of Disease.	Stool Culture: Day of Disease.	Other Cultures: Day of Disease.	Discharge or Death.
79	24 M.	Severe	?	Negative 7th day Positive 21st day	Negative 7th day	Positive 7th day Positive 20th day	Russo's test positive 21st day	Still in hospital on 35th day, but improving
80	? F.	Severe	No	Negative 11th day Positive 16th day Positive 23rd day	Positive 5th day	Negative 5th day Negative 9th day Negative 11th day Negative 16th day	Urine cult. negative 10th day Urine cult. negative 16th day Russo neg. 4th day Russo neg. 7th day Russo neg. 10th day Russo neg. 16th day	Still in hospital on 34th day, but improving

Cases 45, 46, and 47 were interesting both on account of the age of the patients and on account of their double infection. They were children from one family; their ages, five years, three years, and five months respectively. They became ill at about the same time and their clinical histories were practically identical. From all, typhoid bacilli were isolated. A few days after admission malarial crescents were found in the blood of the five-year-old child, and the blood of the five months' baby showed large numbers of aestivo-autumnal plasmodia of all stages, together with some forms which were apparently tertian. In the latter, almost every red blood-cell contained at least one and some contained several parasites; the child died sixteen days after admission.

Case No. 60 was a man, æt. twenty-five. He had been sick one week when he entered the hospital. All cultures were negative until a few days before his death, which occurred on the fifty-second day of the disease. On the forty-eighth day, stool culture was positive and on the fiftieth day blood culture was positive. The Widal test, however, was positive on the twentieth day and again on the thirty-third day.

Case No. 68, a man, æt. thirty-one, ran a severe course and perforation occurred on the fifteenth day. The bowel was resected and patient did well for a few days, then relapsed and died on the twenty-second day.

Case No. 80 is interesting mainly because of the laboratory history. She is a nurse in the hospital, and, for that reason, it has been possible to follow up the case very closely. On the fifth day of the disease, the blood culture was positive. Stool and urine cultures, made at intervals,

have never developed typhoid organisms, although six stool cultures and four urine cultures have been made. The urine has always been negative to the Russo test. The Widal test was negative on the eleventh day of the disease, positive on the sixteenth day, and has remained so to date of writing, the thirty-fourth day of the disease. Her fever is now declining and she is improving.

The writers' technique for the Widal test is as follows: The typhoid strain used by them has been secured from Chicago and kept by them for about eighteen months. Fresh broth cultures are made daily. Several drops of blood are secured, usually in a small U-shaped tube, and centrifugalized until the clear serum is separated. Dilutions of 1-50 and 1-100 are then made with sterile broth. One hour is allowed for the reaction; and a positive reaction is one in which there are no motile organisms present and all are well clumped at the end of the hour or in less time.

The writers' technique for blood culture is very simple. A 10 c.cm. Luer syringe is sterilized, protected in a large glass tube. The patient's arm is constricted above the elbow by means of a rubber or gauze tourniquet, until the veins at the bend of the elbow stand out prominently. We have found thorough scrubbing with alcohol a sufficient skin sterilization. 8 to 10 c.cm. of blood are then drawn up into the syringe; 1 to 1.5 c.cm. are mixed well with about 100 c.cm. of sterile broth in a flask; 1 to 1.5 c.cm. with about 8 c.cm. of sterile bile, and about 1 c.cm. is added to each of three agar plates. All of these are then incubated for twenty-four hours. If at the end of that time, hanging drops show motile bacilli resembling typhoid organisms in their morphology and manner of motion, subcultures are made on litmus milk, glucose agar, agar slant, broth and peptone. In many cases, subcultures were made at the end of twenty-four hours whether the hanging drops showed motile bacilli or not. In other cases, the original cultures were incubated another twenty-four hours before subculturing. In some cases, the earlier subculturing hastened the diagnosis. In some cases, growth was obtained earlier in the bile media than in the broth, but in most cases there was but little difference. We have only infrequently obtained a growth of typhoid organisms on our original blood-agar plates, but have been able by means of these to rule out streptococcus and pneumococcus infections. If the subcultures showed a characteristic growth in the agar slant, with no acidification of the litmus milk, no gas in the glucose agar, no indol in the peptone culture and a characteristic motile bacillus in the broth, the diagnosis was considered sufficiently established.

Most of the writers' stool and urine cultures were made in the litmus-crystal-violet-lactose-agar media suggested by Conradi and Drigalski in 1902. The liquid stool was well stirred, and one or two large loops mixed with a 10 c.cm. tube of sterile broth. A large loop was transferred from this to a second tube of broth. These were then incubated

for two or three hours and dilutions made through six tubes of the Conradi-Drigalski media and poured in large Petri dishes, which were incubated about eighteen to twenty-four hours. If small blue colonies developed, they were fished and subcultured, in broth, litmus milk, glucose agar, peptone solution and agar slant, as described under the blood cultures, except that so great a dilution was usually not necessary.

The Widal test was made in 76 cases, in several of which it was made two or more times, so that a total of 107 Widal tests were made. This test was at some time positive in 42 of the cases, or 55 per cent., while 34, or 45 per cent., of the cases gave no positive test. Of all the Widal tests made, 54 per cent. were negative, 36 per cent. were positive, and 10 per cent. were suggestive. Seven tests were made during the first week of the disease, none being positive, but one being suggestive. In the second week of the disease, 38 Widal tests were made, 25, or 66 per cent., being negative and 13, or 34 per cent., being positive. In the third week, 21 tests were made, 11, or 52 per cent., being negative and 10, or 48 per cent., being positive. In the fourth week, 17 tests were made, 3, or 18 per cent., being negative, and 14, or 82 per cent., being positive. Later than the fourth week of the disease, 15 tests were made, 7, or 46 per cent., being negative and 8, or 54 per cent., being positive.

Blood cultures were made in 75 cases; in 24 of which they were made two or three times, so that the total number of blood cultures made was 105. In 44 of the 75 cases, the blood culture was positive at some stage in the disease, while in 31 cases, or 41 per cent., the organisms could not be obtained from the blood at the time when the attempt was made. Of the entire number of blood cultures made, 46, or 43.8 per cent., were positive and 59, or 56.2 per cent., were negative. 12 blood cultures were made during the first week of the disease, 8 of which, or 66 per cent., were positive, and 4, or 33 per cent., were negative. In the second week, 37 blood cultures were made, 18, or 48.7 per cent., being positive and 19, or 51.4 per cent., being negative. In the third week of the disease 20 blood cultures were made, 8, or 40 per cent., being positive and 12, or 60 per cent., being negative. In the fourth week of the disease 18 cultures were made, 8, or 44 per cent., being positive and 10, or 55 per cent., being negative. After the fourth week, 18 cultures were made from the blood, 4, or 22 per cent., being positive and 14, or 77 per cent., being negative. It may be noted that one positive was obtained on the fiftieth day of the disease and one on the fifty-fifth day.

Stool cultures were made in 67 cases, several being made at different stages in 8 of the cases, so that the total number of cultures made was 102, the total number of positives being 54, or 53 per cent., while the total number of negatives was 48, or 47 per cent. Of all the cases tested, 46, or 69 per cent., gave a positive stool culture at some stage of the disease, while in only 21, or 31 per cent., was the organism never

isolated from the stool. Only three stool cultures were made during the first week of the disease, of which one was positive and two negative. 26 cultures were made in the second week, in 18 of which, or 70 cent., the typhoid bacillus was isolated from the stool, while in 8, or 30 per cent., none developed in the cultures from the feces. In the fourth week of the disease, of the cultures from the stools of 14 patients, 9, or 66 per cent., were positive and 5, or 33 per cent., were negative. Later than the fourth week, 29 stool cultures were made, 8, or 27 per cent., being positive and 21, or 73 per cent., negative. In one case, typhoid bacilli were isolated from the stool on the forty-sixth day of the disease, in 2 cases on the forty-eighth day, and in 2 on the fifty-second day.

Cultures were made from the urine nineteen times, this representing 15 cases. Of these cultures, 5 were positive and 14 negative. The Russo test was made in only 16 cases, being positive in 13, or 81 per cent., and negative in 3 cases. One of the positive cases proved to be not a typhoid, and one of the typical typhoid cases in which the blood culture was positive on the fifth day never gave a positive Russo, although it was tried six times at intervals of several days.

Three spinal fluids were examined, one proving to be a pure culture of typhoid, while the other two were negative. One pure typhoid culture was obtained from a middle ear and one from a pleuritic exudate following appendectomy. At autopsy, the typhoid bacilli have been isolated from the lung, heart-blood, the gall-bladder, the spleen, and from the intestinal contents.

Table II. summarizes very briefly the most important results of our work.

TABLE II.

	Widal Test.	Blood Culture.	Stool Culture.	Urine Culture.
To'al number of tests............	107	105	102	19
"　　"　　" positives	59	46=43.8%	54=53%	5
"　　"　　" negatives	57	59=56.2%	48=47%	14
"　　"　　" cases tested......	76	75	67	
"　　"　　"　" positive ..	42= 55%	44=58.7%	46=69%	5=33%
"　　"　　"　" negative ..	34= 44%	31=41.3%	21=31%	10=66%
No. positives 1st week............	0	8=66%	1=33%	
" negatives "　"	7=100%	4=33%	2=66%	
" positives 2nd week............	13= 34%	18=48.7%	18=70%	
" negative "　.............	25= 66%	19=51.4%	8=30%	
" positives 3rd week............	10= 48%	8=40%	18=60%	
" negatives "　.............	11= 52%	12=60%	12=40%	
" positives 4th week............	14= 82%	8=44.4%	9=65%	
" negatives "　"　.............	3= 18%	10=55.5%	5=35%	
" positives after 4th week.......	8= 54%	4=22.2%	8=27%	
" negatives "　"　"　.......	7= 46%	14=77.7%	21=73%	

The results of the writers' work, while corresponding in the main with those of Coleman and Buxton and others, do not give as high a

percentage of positives as has been given by others. This is due, no doubt, largely to the facts that most of their patients do not enter the hospital before the second or third week of their disease, and that very often it has not been possible to make cultures frequently. To obtain reliable and accurate data, it would be necessary to begin making all the tests early in the first week of the disease and to repeat all the tests at least once a week throughout its course. This has been impossible in this series of cases, but, nevertheless, the figures, as they stand, are very suggestive. It may be seen that the largest percentage of positive Widal tests occurred during the fourth week of the disease, entirely too late for diagnostic purposes, while none occurred during the first week. Moreover, the writers have obtained very characteristic Widal tests in four non-typhoid cases. One proved at autopsy to be a pure septic peritonitis and general infection with no trace of typhoid and no history of ever having had an attack of typhoid fever; another was a pure and well-marked streptococcemia, while two had a febrile condition which cleared up in a few days. None gave a history of previous typhoid. There have been several very severe and even fatal cases of undoubted typhoid which have never given a positive Widal reaction. The Widal reaction depends upon the presence of agglutinin in the blood and for that reason must of necessity occur relatively late in the disease, and in very severe cases, in which agglutinins and other antibodies are not formed or are formed in very small amounts, this test is always negative; for these reasons, the Widal reaction should, it seems to the writers, be regarded as a prognostic, rather than as a diagnostic sign, so far as it may be considered specific at all. The fact that the writers, as well as numerous other authors, have found a number of non-typhoid cases whose blood gave an absolutely positive Widal agglutination reaction suggests that too much reliance cannot be placed upon the specificity of the test.

The blood culture, on the other hand, is positive in the majority of cases during the first week of the disease, long before the agglutination test can be expected to be positive. When positive, there can be no question as to its reliability. It is simple and harmless and can, it seems, by the aid of bile media, be made generally available in all places where there is a fairly well-equipped laboratory. A sterile hypodermic syringe, or even a sterile needle alone can be inserted into the vein, and 1 or 2 c.cm. of the blood mixed with the bile can be sent to the laboratory with very little more trouble than attends the sending of diptheria cultures or even dried blood for the Widal test. Indeed, sufficient blood might be drawn from the finger or the ear for the culture without puncturing a vein. Stoner states that, in the Baltimore Board of Health Laboratory, a tube of bile media is placed in each Widal outfit with the request that 15 drops of blood or a loop of stool, if too late for a positive blood culture, be mixed with the bile and sent to the laboratory. He says that by this method, since it has been on

trial, they have obtained 51 positive blood cultures during the first week of the disease. Cultures from the stools also give reliable information, although somewhat later usually than that from the blood culture, and a diagnosis can often be obtained by culturing the feces when both the blood culture and the Widal test have failed. Moreover, terminal examinations of both stools and urine should be made in all cases to determine whether the patient is still harboring the organisms after he has clinically recovered from the disease. Price, Stokes, and Rohrer have recently published a communication on the method of controlling typhoid fever which they are now using in Baltimore. On the report of a case of typhoid fever, a "Standard Prophylactic Package for Typhoid Fever" is delivered at the house by an inspector who also makes up the disinfectant solution to be used. Careful directions for use are left with the package. When the patient has clinically recovered, cultures from the feces and urine are sent to the laboratory in the bile media outfit described in Stoner's article on blood cultures. As long as these cultures are positive, the patient is kept under surveillance and required to continue the disinfection of his excreta.

This is surely a step in the right direction and the establishment and enforcement of a law by both State and City Health Boards, requiring, as in diphtheria, two authentic negative cultures from the stools and urine of typhoid fever patients before releasing them from surveillance would go far to eradicate a disease which is entirely preventable and should be stamped out.

In conclusion, the writers desire to express to Dr. Downey L. Harris, their gratitude and appreciation for his constant and helpful interest during the progress of this work.

BIBLIOGRAPHY.

Adams (*Amer. Journ. Med. Sciences*, Vol. CXXXIX, p. 638, 1910).
Adler: Osler's "System of Medicine."
Coffin (*New York Post Graduate*, Vol. XXIII, p. 1048, 1908).
Coleman and Buxton (*Amer. Journ. Med. Sciences*, Vol. 133, p. 896, 1907. *Journ. Med. Research*, Vol. XXI, p. 83, 1909).
Collins (*Journ. Exper. Med.*, Vol. X, p. 529, 1908).
Conradi and Drigalski (*Zeitschr. fuer Hyg.*, Vol. XXXIX, 1902).
Gruber (*Verhandl. Cong. fuer Innere Med.*, Wiesbaden, 1896).
McCrae: Osler's "System of Medicine."
McFarland (*Phil. Med. Journ.*, 1899).
Pratt, Peabody and Long (*Journ. Amer. Med. Assoc.*, September 7th, 1907).
Price, Stokes and Rohrer (*Journ. Amer. Med. Assoc.*, January 20th, 1912).
Rolph and Nelson (*Medical Record*, Vol. 80, p. 373, 1911).
Russo (*Riforma Medica*, 1905).
Stoner (*Maryland Med. Journ.*, Vol. LIII, p. 347, 1910).
Troissant (*La Méd. Mod.*, February 11th, 1903).
Widal (*Bulletin de la Soc. Méd. des Hopit.*, Vol. VI, 1896. *La Semaine Médicale*, Vol. XXVI, p. 547, 1906).

THE RADIO-PHALANGEAL REFLEX IN LESIONS OF THE PYRAMIDAL TRACT.

By M. W. Hoge, M. D., of St. Louis.

We have at our disposal in the lower limb a number of reflexes which are indicative of organic interference with the normal functioning of that portion of the pyramidal tract which is in relation with the lumbar enlargement of the cord. As, for example, in addition to increased tendon reflexes, we have patellar- and ankle-clonus, Babinski's, Oppenheim's and Gordon's signs, and the recently described Chaddock's* ankle-sign.

While none of these is so constant as to be demonstrable in every case of organic defect or disease affecting this portion of the pyramidal tract, one or more of them may be found in probably every case in which the lesion is not of such a character as entirely to suppress reflex activity.

It is of distinct advantage in diagnosis that we have this number of signs of demonstrated value, since in the absence of some of them, and, as may happen, of those considered most constant, we then have others available by means of which a suspected pyramidal lesion may be definitely diagnosed.

At times a lesion may be of much clinical importance and be so situated as to implicate principally or solely that portion of the pyramidal tract which is in relation with the cervical enlargement, so that reflex changes are to be found only in the upper limb. Then our diagnostic resources are quite limited as compared with the situation in the lower limb.

Until recently, unless perceptible impairment of voluntary motion should be found, we have been limited to comparing the periosteal and tendon reflexes of the supposed affected side with those of the supposed sound side, or where both tracts were considered to be involved, to comparing the reflexes found with an ideal normal reaction. The wrist-clonus is a rare phenomenon in the writer's experience, and only found in cases where there is obvious spastic paresis. A valuable addition to the foregoing is Chaddock's wrist-sign.**

In 1902 von Bechterew described a reflex† which he called the metacarpo-phalangeal, occurring where reflex irritability is increased, and consisting in a flexion of the phalanges of the fingers and extension

of the thumb, and produced by percussion over the carpal and metacarpal regions.

In the examination of a large number of cases, while frequently obtaining the reflex in the manner described, the writer has not been able to do so with sufficient constancy to feel that it is a reliable sign in actual practice. He has, however, found that in cases of pyramidal lesion, even of slight character, it can be obtained, in all but a small proportion which will be referred to later, by percussion over the radial region; and he desires to submit the following report of a study of it when thus produced, and to take the liberty of terming it, under this condition, the radio-phalangeal reflex, not claiming, however, that it is then a distinct reflex from that described by von Bechterew, nor asserting priority in this method of producing it, but simply as a statement of the evidence which he has collected of its clinical value.

In a normal individual, if the forearm be supported in a semi-flexed position, midway between pronation and supination, the finger muscles relaxed, so that the fingers rest midway between flexion and extension, and if the lower portion of the lateral face of the radius be tapped with a percussion hammer, no reflex movement occurs in the phalanges. Only, occasionally, with each stroke of the hammer the fingers become a little more flexed, and do not return to their previous position. This is not a reflex movement, but simply results from the jar of the stroke, causing to become more active the normal tendency of the fingers to flex into the palm.

The foregoing conclusion is based on an examination of forty individuals who showed no evidence of organic disease of the nervous system. A few apparent exceptions will be considered later.

But if there be an organic lesion of that part of the pyramidal tract which is in relation with the upper extremity, the manoeuver just described will cause a quick flexion of the second and third phalanges of one or more of the fingers, the thumb remaining stationary, or extending if its extensor tendons be tapped; the phalanges which flexed immediately returning to their previous position.

The writer has so far found this sign present in 52 cases in which there were obvious lesions of the pyramidal fibres related to the upper extremity, or in which other signs of pyramidal disease or defect were present. 22 of the cases were hemiplegias of cerebral origin. These all gave this reflex distinctly on the paralyzed side; many of them gave it also, but less actively, on the opposite side, and in the latter class the tendon reflexes were also quite active on the non-paralyzed side.

In one case of hemiplegia, instead of flexion, the writer obtained a quick strong extension of the thumb and all the fingers at the single examination that he was able to make. (Inversion of a reflex. Babinski.)

In one case of organic disease, character not determined, in which the tendon reflexes were all quite active, with patellar- and ankle-clonus

and Babinski's sign and Chaddock's ankle-sign bilaterally present, this sign was also present bilaterally. It was present bilaterally in one case of multiple sclerosis and in one case of cerebral syphilis, with bilateral Babinski sign, ankle-sign and ankle-clonus.

In one case of cerebral syphilis, in which the tendon reflexes were all very active, but stronger on the left, this sign was present bilaterally, but stronger on the left.

In one case of a psychosis, form not determined, in which the Babinski and ankle-signs were present, this sign was bilaterally present.

In one case of epilepsy in which the tendon reflexes of the upper extremities were all quite active, this sign was present bilaterally. In this case Chaddock's wrist-sign was present bilaterally and his ankle-sign present on the right.

Two patients in the St. Louis City Hospital, for diseases not of the nervous system (one for disease of heart and kidneys, one for corneal ulcer), presented the sign bilaterally, and also gave the ankle-sign bilaterally.

A patient in the City Hospital for neuralgia of the first division of the right trigeminus, probably due to intracranial or sinus disease, gave this sign on the left. He also gave a Babinski and ankle-sign on the left.

A patient having Jacksonian attacks, affecting the right upper extremity, presented this sign on the right only.

In 2 cases of a psychosis, probably dementia præcox, it was present bilaterally. These patients also had unequal pupils, very active tendon reflexes, and the ankle-sign was present in both.

The writer has found this sign present in a few individuals who had no subjective symptoms of illness or disability, but in whom, on examination, he found objective signs, such as inequality in the tendon reflexes, Babinski's fanning of the toes, or the ankle-sign.

It was also present in several cases of paretic dementia in which other signs of organic disease were observed.

The remaining cases were of the same general character as those already cited.

The writer failed to obtain the reflex in a few cases, in which he expected it to be found, as follow :—

In a case of paresis, presenting other signs of pyramidal disease, the patient objected to the examination and could not be persuaded to allow the hand to lie quiet and relaxed. In another case of the same disease the patient was over-anxious to assist in the examination, and persisted in holding the hand and fingers stiff.

A child admitted to the City Hospital in a state of shock following a blow on the left side of the head, gave toe-signs on both sides, stronger on the left. Tendon reflexes were obtained in the right upper extremity, but not in the left, and the finger reflex also could not be

produced. On the following day the patient had, to a large degree, recovered from shock. Tendon reflexes could then be obtained in the left upper extremity, and the finger reflex was also obtainable, and persisted during the few days that the patient remained in the hospital. The grasp of the left hand was plainly somewhat weaker than that of the right, and other signs of pyramidal involvement continued more manifest on the left side. (Major injury to the right side of the brain by *contre-coup.*)

The writer has stated that he found the reflex under consideration apparently present in a few individuals who showed no other signs or symptoms of organic nervous disease. All physicians are familiar with the type of "neurotic" patients who over-react to stimuli, giving the exaggerated tendon reflexes and occasionally an ankle-clonus, more or less closely resembling the signs found in organic disease. In some of these a tap on the radius causes a convulsive movement of the entire upper extremity. They complain that the stroke causes an "electric thrill" to pass through the whole limb.

These phenomena the writer considers not to be expressions of the activity of the reflex arcs with which we are experimenting, but of psychic origin. They are psychic rather than neural reflexes. They are most prominent at the first examination, and at the beginning of that examination. When the patient has come to regard the testing of the reflexes as a commonplace affair, not calling for any special interest or attention, the abnormal features just mentioned disappear, and only normal reflexes remain.

So far, it is only in this class of patients that the writer has found the sign he is describing, without the coexistence of other signs of organic disease. When he was able to make repeated examinations, the previously existing over-activity of the tendon reflexes gradually diminished and disappeared, and, with this, also the reflex observed in the fingers.

The writer does not always obtain the reflex from exactly corresponding points on the radius. Sometimes it is obtained only after tapping over a considerable area of the lower lateral face of the bone, and occasionally by striking the tendon or belly of the brachio-radialis.

From the foregoing observations, the writer feels justified in considering this reflex an aid to diagnosis in lesions of that part of the pyramidal tract which is in relation with the cervical enlargement of the cord; not as being of itself and alone sufficient for such a diagnosis, but as of value when properly correlated with other signs and symptoms. Nor that, alone, it should be considered as necessarily indicating an active or severe lesion. It appears to be easily induced and quite persistent, and may be the result of an old injury or process which has not impaired function.

In a few of the writer's cases, where it was found along with other recognized signs of pyramidal lesion, he considered the possibility of the cause being a slight congenital defect which was fully compensated.

601 Metropolitan Building.

A TRIPLE BISMUTH MEAL FOR GASTRO-INTESTINAL FLUOROSCOPY.

By E. H. SKINNER, M. D., of Kansas City, Missouri.

The arrangement of bismuth meals for the fluoroscopic inspection of the gastro-intestinal tract is extremely important. The interval of time, between the administration of the opaque bismuth meal and the inspection, varies with the information desired. For instance, the patient must report at different intervals after eating the bismuth meal in order to determine the emptying rate of the stomach, or a possible lesion of the transverse colon.

Since 1908 the writer has used no opaque material other than bismuth oxychloride, which is a rather expensive purified product. He has had absolutely no untoward effects from this salt. It does not constipate like the subnitrate of bismuth, nor does it turn the stool black. In fact, it seems to pass through the alimentary tract unchanged, being practically insoluble salt. One does not, necessarily, have to give cathartics to assist the exit of the bismuth administered by mouth, but a glycerine and water enema sometimes relieves the passage of hard masses of bismuth. The only time when it is necessary to insist upon and advise an enema is after a large bismuth injection, per rectum, which has filled the entire colon.

There are many patients, who come to the writer's laboratory from the surrounding territory, who wish to return home the same day. Therefore, he has adopted the following schedule of bismuth meals, which permits the inspection of the entire alimentary tract at one appointment, with reasonably satisfactory diagnostic results. He designates this method as the "triple bismuth meal."

The patient eats the first bismuth meal at 10 a. m. on the day previous to the examination. The second meal is eaten at 4 a. m. of the next day, and then the patient reports at 10 a. m. at the x-ray laboratory the same day. The usual meals intervene. There will be a twenty-four-hour bismuth meal in the colon, and a six-hour bismuth meal in the stomach, small intestine and cecum. From this first inspection one judges the motility and peristalsis of the alimentary tract. If there is a residue in the stomach after the six-hour interval, the writer immediately suspects pyloric obstruction, or interference with the exit of food. If there is much residue in the ileum, he looks into the possibility of an ileal kink. After the thorough inspection of the disposition of these two meals, a third bismuth meal is administered which gives the position, the outline, and peristalsis of the esophagus

and stomach. The writer has never had any untoward effects from such an arrangement of bismuth in the alimentary tract. Jordon[1] and Haudek[2] and others report as much as 8 and 10 oz. of bismuth oxychloride being used without any untoward effects. This salt seems to be insoluble and not affected in the least by the chemistry of alimentation.

Each bismuth meal consists of 2 oz. of bismuth oxychloride thoroughly mixed into 8 to 12 oz. of thin Cream of Wheat porridge. It is eaten with cream and sugar or fruit juices, and is easily tolerated even by timid stomachs. The writer finds that patients who have been subject to frequent vomiting will tolerate this meal, if the fact is impressed upon them that the value of the fluoroscopic examination depends upon the retention of as much of the meal as possible. A smaller meal of 4 to 6 oz. will suffice if the patient refuses to eat or retain more. Where the patient prefers to drink, or he is unable to swallow small masses, the writer advises the thorough mixing of 2 oz. of bismuth oxychloride in about 14 oz. of milk fermented with the Bulgarian ferment. The ordinary farm buttermilk, from which the fats are removed, is not so satisfactory.

Many other bismuth meals have been devised, but the Cream of Wheat porridge provides a medium which holds the bismuth in good suspension for x-ray purposes. The value of the fermented milk has been proved by the experiments of Pfahler in 1906,[3] and Le Wald and Satterlee[4] in 1911.

Recently, the writer has been experimenting with barium sulphate as an opaque substance with great satisfaction. Schwarz[5] reported over four thousand examinations without any ill effects, and with satisfactory fluoroscopic shadows. Barium sulphate can probably be produced for about fifty cents per pound, whereas one now pays more than three dollars per pound for bismuth oxychloride. It is quite necessary to have an acid-free, chemically pure, barium sulphate which is very finely pulverized. The only fault found with the present supply is that it is too gritty. It will no doubt be upon the American market shortly in suitable form and purity. One must use about 50 per cent. to 75 per cent. more barium sulphate than bismuth oxychloride. The saving in expense will be considerable.

The preparation of the patient for the fluoroscopic examination is simple. The writer advises against the use of cathartics or enemas preceding or following the bismuth meals. The x-ray inspection should be made with the patients in their usual alimentary condition. Cathartics or enemas can easily distort the pathological findings by presenting an unusual alimentary function. It is necessary to see the patients in the same condition as when they complain the most, and not when conditions are cleared up by catharsis.

The above directions for patients are usually sufficient for any chronic lesion of the alimentary tract. There are two conditions in which it is essential to see the patient with a stomach which has fasted for twelve hours—namely, superficial non-cicatricial ulcer of the stomach or of the duodenum. One is able to suspect these two conditions from the routine bismuth meals, but the patient should remain another day so as to see the fasting stomach. In fact, in the fasting stomach a ring of spastic contraction occurs at the site of an ulcer when a small amount of bismuth and water is swallowed. This phenomenon occurs only once, and for a very short time in the fasting stomach and can only be observed with the fluoroscope. Experience is necessary to observe this. When a full bismuth meal has filled such a stomach there is no suspicion of spasm, as the full meal stretches the stomach musculature and the stomach appears normal in outline. This observation, which was reported by the writer at the American Roentgen Ray Society in September, 1910, and published by him in the *Journal American Medical Sciences* in June, 1911, has been verified by Stierlin[6] in recent studies.

Duodenal ulcer of the acute non-deforming type, as a rule, presents an abnormally rapid emptying of the stomach. The writer's first article upon this was presented before the American Roentgen Ray Society at Richmond, in November, 1911. These observations have recently been verified by Kreuzfuchs.[7] These duodenal phenomena have been observed in enough cases now to lead one to place reliance upon them. They check up with a searching clinical case history and have been verified by operation in the few that have gone to operation.

All the writer's examinations are made with the protected fluoroscope of the Beclere type, and the Holzknecht, hanging diaphragm. Plate exposures are rarely taken, the writer confining himself to tracings of the fluoroscopic shadows. Thus the expense of radiographs is saved and these examinations made possible to people of even meagre means. The writer believes that the expense of the radiographic methods precludes their use in large charity hospitals, and to all excepting the wealthy or those who seek such examination through much sacrifice. Furthermore he believes the fluoroscopic examination is superior to the radiographic in obtaining findings of value to the diagnosis. Would you not rather view the passing parade than have the flat single picture of a portion of the parade? This is a reasonable simile. There are several symptom-complexes which have been arranged by Holzknecht[8] after many thousand fluoroscopic examinations. The writer adheres to Holzknecht's methods and findings with an enthusiasm born of appreciation and warranted by results.

The writer reports the following cases which came to operation and verified the fluoroscopic diagnosis:—

Case I.—Mr. P. B. B., *æt.* thirty-one, weight 130 lb. Referred by Dr. R. T. Sloan.

Symptoms.—Distress in the epigastrium, increased by eating. The patient describes the sensation of constantly carrying a brick in the epigastrium after meals. No vomiting. No nausea. Symptoms of eight years' duration. Dieting produces no change. Pain better by raising the stomach with the hand. Previous operation for appendicitis which failed to reveal any appendicitis or relieve the symptoms.

Fluoroscopic Examination.—Inspection of abdomen shows large gas bubbles in splenic flexure. Small *magenblase.* Two drams of bismuth in water enters the stomach immediately from the esophagus and drops to the lower pole. Failed to show any spasm of contraction on greater curvature. 2 oz. of bismuth and 14 oz. of buttermilk reveals atonic stomach, with the lower pole five fingerbreadths below the umbilicus; pylorus to the right and on a level with the umbilicus. Peristalsis is exhibited immediately and vigorously. The stomach is elongated, dilated and atonic. No filling defect.
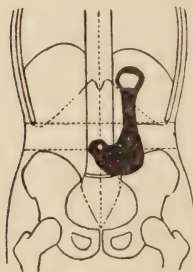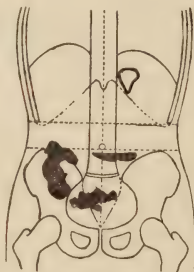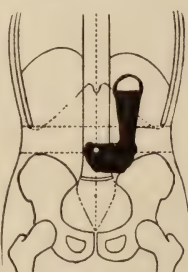
Fig. 1.   .   Fig. 2.   Fig. 3.

Fig. 1.—Case I. Showing broad shadow of the lower pole of dilated stomach. Peristalsis excessive.

Fig. 2.—Case I. Showing residue eight hours after bismuth meal. Cecum and ascending colon filled. Ileum also shows shadows of bismuth.

Fig. 3.—Case II. Showing bismuth meal in stomach with broad horizontal shadow at the incisura angularis. Vigorous peristalsis of greater curvature with no corresponding wave upon the lesser curvature.

Second examination after a six-hour interval shows a large residue in the stomach, which still exhibits deep peristalsis. There is a large amount of bismuth in ileum and small intestines; large gas bubbles in the hepatic and splenic flexures.

Third Examination.—At the eight-hour interval the stomach shows a half-moon shape residue in the stomach.

Radiological Diagnosis.—Ulcer with cicatricial stenosis of pylorus.

Operation by Dr. F. G. Sheldon revealed ulcer at pylorus. Gastro-enterostomy.

Case II.—Mr. F. P. C., *æt.* sixty, referred by Dr. Clendenning.

Symptoms.—Thirty years ago commenced to grow weaker and finally vomited blood. Severe pain for a few days before he vomited blood. Decreased in weight to 121 lb. He shortly became stronger and increased to 170 lb. Weight and general condition continued stationary up to two years ago when stomach

symptoms returned. Pain present with no reference to meals. Hemorrhage from the stomach in January, 1911. Lost 15 lb. by July, 1911. Vomits very infrequently. Pain is now continuous over the abdomen, especially in the epigastrium.

Fluoroscopic Examination.—Stomach fills with a pseudo-hour-glass contraction at the pars media. This neck-like shadow of the pars media is not a filling defect, such as is seen in carcinoma of the pars media. Peristalsis of the greater curvature is vigorous. There is no wave of contraction upon the lesser curvature to meet the peristaltic wave of the greater curvature. The usual sharp angle of the incisura angularis is absent, and in its place there is a broad horizontal shadow without any movement upon respiration, abdominal pressure or voluntary contraction of the abdominal wall. Stomach empties between the fifth and sixth hours.

Radiological Diagnosis.—Old, broad, callus ulcer upon the lesser curvature above the pylorus at the usual site of the incisura angularis. Carcinomatous infiltration upon this old ulcer base. Pylorus patent.
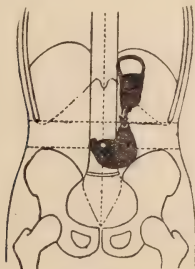
Fig. 4.
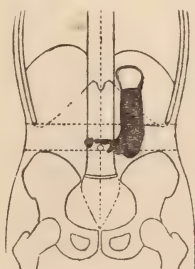
Fig. 5.

Fig. 4.—Case III. Showing filling defect of the pars media from organic involvement.

Fig. 5.—Case IV. Showing the filling defect of the pars media with some bismuth in the duodenum, and small neck of bismuth in patent pylorus.

Operation by Dr. W. S. Sutton revealed carcinoma upon the lesser curvature of the stomach with metastasis upon the surface of the liver.

CASE III.—Mr. C. H., *æt.* fifty, referred by Dr. Clendenning from Bell Memorial Hospital.

Symptoms.—Stomach trouble of eight or nine months' duration. Started with a sour stomach after eating, during the summer of 1911. Acute pain in the stomach at this time. No diagnosis. Pain after eating. Feels better after vomiting. Loss of 45 lb. in four months. No blood in vomitus or stool. Constipated. Often vomits twelve hours after eating. Often vomits in the morning the meal of previous evening. Suggestions of mass in left hypogastrium. Stomach-tube met with apparent obstruction at the white mark. After manipulation of the stomach-tube some fresh blood was returned with the residue of test meal.

Fluoroscopic examination shows a filling defect of the pars media. Cardia fills to about the normal size and then the bismuth begins to trickle through the pars media, again expanding in the pyloric end of the stomach. There is an

hour-glass shadow of the stomach with neck about three fingerbreadths long.

Operation by Dr. W. S. Sutton revealed carcinoma of the pars media.

Radiological Diagnosis.—Inoperable carcinoma of pars media.

Operation by Dr. W. S. Sutton revealed carcinoma of the pars media.

CASE IV.—Mr. F. M., *æt.* fifty, referred by Dr. Clendenning from Bell Memorial Hospital.

Symptoms.—Patient first entered North End Dispensary in October, 1911. Complained of pain in the epigastrium after meals. Patient was thin and there was a suspicion of visible peristalsis. No vomiting. Was sent to a hospital where he remained for a week, and was discharged as well at the end of this time, after being dosed with salts under the diagnosis of constipation. Returned to the North End Dispensary in May, 1912. Complains of agonizing pain after meals. No vomiting, no blood in stool. Has recently lost 15 lb. in weight. There was tenderness in epigastrium with some rigidity of left rectus muscle. An indefinite mass, moving upon respiration, could be felt to the left and above the umbilicus.
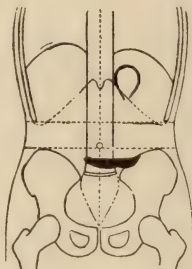
Fig. 6.   Fig. 7.

Fig. 6.—Case V. First bismuth porridge meal showing the enormously dilated stomach with the broad lower pole exhibiting vigorous peristaltic waves.

Fig. 7.—Case V. Residue of bismuth meal ten hours after ingestion, showing half-moon shadow in lower pole of stomach. *Magenblase* is shown below left diaphragm.

Fluoroscopic Examination.—Esophagus normal. Bismuth and buttermilk passes rapidly to the stomach and is halted at the center of the lesser curvature, where it begins to distend the greater curvature and fill up the fundus of the stomach. The pyloric area and lower pole of the stomach refuse to fill, but some bismuth is seen in duodenum.

Radiological Diagnosis.—Circular carcinoma of the pyloric area of the stomach. Adhesions of the third segment of the duodenum.

Operation by Dr. W. S. Sutton revealed a large tumor-mass upon the anterior wall of the stomach, just above the pylorus, with adhesions of the duodenum.

CASE V.—Mr. F. D., *æt.* thirty, referred by Dr. Froehling.

Symptoms.—Pain after meals. Frequent vomiting. The patient has a clinical history of ulcer, although he had been referred by surgeons, only two weeks before this, for possible stone in kidney. The *x*-ray revealed no stone in kidney.

Fluoroscopic examination reveals an immense dilatation of the stomach,

both longitudinally and transversely. The lower pole of the stomach reaches four fingerbreadths below the umbilicus. Pylorus in good position above and to the right of umbilicus. Pronounced peristalsis. Exit of food from the stomach delayed eight to ten hours. No reverse peristalsis could be determined.

Radiological Diagnosis.—Ulcer of the pylorus with cicatricial obstruction.

Operation by Dr. Binnie revealed an old callous saddle-ulcer at and above the pylorus. After gastro-enterostomy, patient made a rapid recovery, with gradual increase in weight and complete recovery from his symptoms, which had been of eight years' duration.

CASE VI.—Mr. P., *æt.* sixty-two, referred by Dr. Hertzler.

Symptoms.—Pain in the epigastrium. No vomiting. Findings by test meal are negative. Appetite good, but eats little. Loss of 25 lb. in eight months. Progressive loss of weight, however, lead Dr. Hertzler to suspect carcinoma.

Fluoroscopic Examination.—Esophagus normal. Food enters at the cardia and takes the direction sharply to the left, as if passing around obstruction
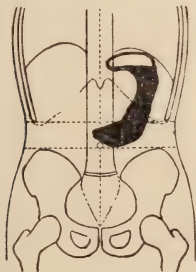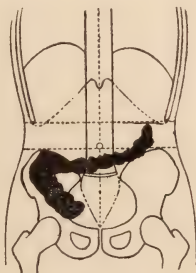
Fig. 8.   Fig. 9.

Fig. 8.—Case VI. Showing bismuth meal in stomach. Note the angulation to the left of the lesser curvature just below the cardia, indicating filling defect. This defect was more clearly outlined upon watching the first few swallows of bismuth and water.

Fig. 9.—Case VI. Six hours after bismuth meal the stomach is empty and the head of bismuth column has reached the splenic flexure. This case corresponds to Holzknecht's Symptoms Complex, No. X.

just below the cardia. The stomach fills completely to the pylorus, and the lesser curvature shows a filling defect. No peristalsis upon the normal ileum of the stomach, giving the stomach further a sickle-shape. No peristalsis upon the lesser curvature. After six hours the stomach is completely empty and the head of the bismuth meal is in the splenic flexure.

Radiological Diagnosis.—Tumor of the lesser curvature just below the cardia, probably developing from an old saddle-ulcer. Greater curvature not involved. Pylorus patent.

Operation by Dr. Hertzler revealed a carcinomatous growth upon the lesser curvature extending to the posterior wall of the stomach.

This report does not purport to exploit anything new or original. The first work of this kind was based on the experimental efforts of

Cannon as early as 1898. Holzknecht, of Vienna, acknowledges his indebtedness to Cannon. The methods pursued by the writer have had thorough exploitation in European Clinics. Volumes of reports have been published in Germany and France. With the modern fluoroscopic apparatus of both American and European manufacture there is a minimum of danger to the radiologist, and absolutely no ill effects to the patient.

BIBLIOGRAPHY.

1 Jordan (*Lancet*, Vol. CLXXXI, No. 4609, p. 1823, December 30th, 1911).

2 Haudek (Cited by Jordan in above article).

3 Pfahler (*Journ. Amer. Med. Assoc.*, Vol. XLIX, pp. 2069-2074).

4 Satterlee and Le Wald (*Journ. Amer. Med. Assoc.*, Vol. LVII, p. 1255).

5 Schwarz (*Berl. klin. Wochenschr.*, Vol. XLIX, p. 725, April 15th, 1912).

6 Stierlin (*Muench. med. Wochenschr.*, Vol. LIX, No. 16, April. 16th, 1912).

7 Kreuzfuchs (*Wien. klin. Wochenschr.*, Vol. XXV, No. 11, March 14th, 1912).

8 Holzknecht (*Arch. Roent. Ray*, Vol. XVI, No. 6, p. 206, November, 1911).

1019 Rialto Bldg.

MEDICAL AND SURGICAL PROGRESS.

CLINICAL EXAMINATION OF PUNCTURE FLUIDS.

A REVIEW OF RECENT LITERATURE.

By Jesse S. Myer, M. D., of the Editorial Staff

AND

Jerome E. Cook, M. D., of St. Louis.

1. Ross and Jones: On the Use of Certain New Clinical Tests in the Diagnosis of General Paralysis and Tabes. (*British Medical Journ.*, May 8th, 1909.)
2. Noguchi and Moore: The Butyric Acid Test for Syphilis in the Diagnosis of Metasyphilitic and other Nervous Disorders. (*Journ. Exper. Medicine,* Vol. II, p. 604, 1909.)
3. Dunn and Stevens: The Examination of the Cerebrospinal Fluid. (*Interstate Medical Journal*, April, 1912.)
4. Nonne: Clinical Diagnosis of the Syphilogenous Disease of the Central Nervous System. (*Journ. Amer. Med. Assoc.*, July 24th, 1909.)
5. Amsden: Report of Certain Lumbar Punctures at Bloomingdale Hospital. (*New York Medical Journ.*, p. 438, 1910.)
6. Strouse: The Diagnostic Value of the Butyric Acid Test in the Cerebrospinal Fluid. (*Journ. Amer. Med. Assoc.*, April 22nd, 1912.)
7. Bybee and Lorenz: A Report of 50 Examinations of Cerebrospinal Fluid with Special Reference to the Cell Count. (*Arch. Internal Med.*, Vol. VII.)
8. Dreyfus: Late Nervous Manifestations of Syphilis. (*Muench. med. Wochenschr.*, May 7th, 1912.)
9. West and Corlett: Report of 100 cases of General Paralysis of the Insane with Cytological Findings. (*Cleveland Med. Journ.*, May, 1912.)
10. Hohn: The Findings in Cerebrospinal Fluid in Tuberculous Meningitis. (*Berl. klin. Wochenschr.*, May 1st, 1912.)
11. Hemenway: The Constant Presence of Tubercle Bacilli in the Cerebrospinal Fluid of Tuberculous Meningitis. (*Amer. Journ. Dis. of Children*, Vol. I, 1911.)
12. Morris: The Incoagulable Nitrogen of Puncture Fluids with Special Reference to Cancer. (*Arch. of Internal Med.*, October, 1911.)
13. Quincke: Concerning the Organized Elements of Transudates. (*Deutsch. Archiv fuer klin. Med.*, Vol 30, p. 1882.)

14. Dock: Cancer of the Stomach in Early Life. (*Amer. Journ. Med. Sciences,* June, 1897.)

15. Miller: Transudates and Exudates with Report on 75 Fluids. (*Amer. Medicine,* November 12th, 1904.)

16. Warren: The Diagnostic Value of Mitotic Figures in the Cells of Serous Exudates. (*Arch. Internal Med.,* November, 1911.)

It is our aim to review the recent additions to our advances in the knowledge of puncture fluids, which has been gained by the laboratory examination, and to detail briefly the technique of such examinations. Many of the facts herein reviewed have already appeared in these pages, but from the point of view of the specialist in relation to some particular disease; and it is our desire now to present the subject in a more general light from the point of view of clinical diagnosis.

Ever since Quincke, in 1882, called attention to the cellular elements of exudates and their diagnostic value, more or less interest has centred about this point, until at present cytodiagnosis has gained a firm place among our diagnostic methods, though its absolute value is by no means undisputed. More recently attention has turned to chemical investigations, and several important tests have been developed. The most promising of these is the one proposed by Nonne and Appelt and modified by Ross and Jones, and again by Noguchi and Moore. It is based upon the fact that in inflammatory conditions of the meninges the cerebrospinal fluid contains an increased amount of globulin, while in other pathological conditions of the central nervous system, non-inflammatory in nature, the amount of globulin is present in amounts not demonstrable by ordinary chemical methods. The original test of Nonne and Appelt devised to demonstrate this increased globulin content, and known as the Nonne "Phase I" reaction, has given way to the modification of Ross and Jones and the Noguchi tests on account of the greater delicacy and ease of interpretation of these latter.

The technique of the Ross-Jones test is as follows: 2 c.cm. of a saturated solution of pure ammonium sulphate (saturated by the aid of heat) are placed in a test-tube and over this is layered very carefully 1 c.cm. of cerebrospinal fluid. In positive cases a ring forms at the zone of contact within three minutes. This is best seen by indirect illumination with a dark background. The Noguchi test is thus described: One part (0.1-0.2 c.cm.) of cerebrospinal fluid is placed in a test-tube. To this is added 5 parts of a 10 per cent. solution of pure butyric acid in physiological salt solution (the butyric acid must be pure to ensure reliable results), the mixture is then heated to boiling, one part of a normal sod. hydrate solution immediately added, and the mixture again boiled. In positive tests a definite floc occurs immediately or within two hours. A faint cloudiness may be caused by normal fluids. The fluid tested must not contain blood. The tests are of decided clinical value. There is general agreement that the test is positive in all cases of tuberculous meningitis and other forms of infectious meningitis, including cerebrospinal syphilis. It is often present in cerebrospinal syphilis when the Wassermann reaction with the cerebrospinal fluid is negative. It is present in over 90 per cent. or nearly all cases of general paralysis, and all observers except Strouse report positive results in all cases of tabes. It is absent in brain tumor, psychoses, and in meningismus associated with the acute fevers where there are signs of meningeal irritation but where no actual meningitis exists.

The other chemical test which has been recently proposed aims at the differential diagnosis of carcinoma involving the serous surfaces. Morris, working on the facts previously announced by Emerson, Fischer and others, that malignant growths contain proteolytic ferments, has attempted to demonstrate the results of such ferment action in the puncture fluids. This he does by determining the percentage of incoagulable nitrogen present in the fluid. The procedure is too complicated for clinical use; hence will not be described here. The conclusions drawn thus far are that a negative result does not exclude the diagnosis of cancer while a positive result makes it highly probable.

Of little value for differential diagnosis is the determination of such factors as the specific gravity and the quantitative estimation of albumin. These are influenced by so many different things that they are far from constant in any given condition.

Turning now to the microscopic examination of these fluids, the question of the differential diagnosis of carcinoma again attracts our notice. Some time ago Dock called attention to the presence of large numbers of mitotic figures in cells of a serous exudate taken from a patient with peritoneal cancer. The phenomenon had previously been noted by Rieder. Recently Warren has confirmed these findings in fluids from three different cases of malignant disease involving the serous surfaces. In a case of abdominal lymphosarcoma the ascitic fluid was full of cells, 16-24 micron in diameter, a nucleus staining more lightly than the lymphocytes—with a fissured or lobulated appearance. About one cell in twenty-five showed mitotic figures, and all stages of division were present. Another, the second case, a colloid cancer of the omentum, showed a small number of mitotic figures in the peritoneal fluid. Numerous figures were found in the third case—multilocular cysts of the abdomen. He concludes that while in the majority of exudates due to malignant disease no mitotic figures are seen, their presence in large numbers is almost diagnostic, and when present in small numbers is distinctly suggestive of malignancy. To study the cells the fluid should be centrifuged, the sediment removed by a pipette (after first pipetting off the supernatant fluid), and spread on slides as in making a blood-smear. In staining, good results are obtained with Jenner's or Wright's stain, or hematoxylin and eosin.

The inaccuracy of cytodiagnosis as applied to the cerebrospinal fluid is well known, especially in respect of the quantitative cell count. In the technique commonly employed so many variable factors enter, such as the speed of the centrifuge, the specific gravity of the fluid under examination, the shape of the centrifuge tubes, etc., which affect the final result, that the knowledge thus obtained may be far from uniform or reliable. However, Bybee and Lorenz have found that by working with the uncentrifuged, fresh fluid, constant and dependable results might be expected. In a large number of cases of paralytic dementia examined in this way the results were uniformly positive, showing an increased cell content, while normal fluids were as uniformly negative. Dreyfus believes that an altered cerebrospinal fluid is the most delicate test for involvement of the central nervous system; in fact, his examinations seem to show that a lymphocytosis may exist in the cerebrospinal fluid for a considerable period before any nervous manifestations are evident. He advises having repeated examinations of the cerebrospinal fluid made of all syphilitics, and bases the duration and intensity of the treatment upon the result of such examinations. West

and Corlett likewise believe that an increased cell count in the cerebro-spinal fluid may be seen before any nervous or mental change can be made out. In 100 cases of general paralysis the cell count was uniformly increased, the lowest count being 8 cells per c.cm., with an average of 42. In the method of Bybee and Lorenz the cells are counted in a Thomas-Zeiss blood-counting chamber, the spinal fluid being first mixed in the red blood-counting pipette with a diluting fluid composed as follows:

Methylviolet	0.1
Glacial acetic acid	2.0
Aqua dest. ad	50.

The technique is thus described: Draw the diluting fluid up into the pipette to the division 7, remove the tip of the pipette from the diluting fluid, then draw the contents of the capillary portion of the tube up into the counting chamber coating the sides of same. The pipette is then filled by drawing up fresh puncture fluid and shaken five minutes, allowed to stand twenty minutes, shaken again, and counted.

We cannot bring this review to a close without calling attention to the success which has attended the search for the tubercle bacillus in the spinal fluid in cases of tuberculous meningitis. Hemenway, who reports a total of 135 positive results out of 137 cases, thus describes his technique: The fluid is collected in several test-tubes, allowing about 20 c.cm. per tube. The last fluid withdrawn usually shows the bacilli most readily. The tubes must not be agitated but placed in an incubator over night, sometimes three hours will suffice. A cobweb like film forms, which is then removed by platinum wires, spread flat upon a slide, and fixed and stained as usual for the tubercle bacillus. In about 4 per cent. of fluids the coagulum does not form. In such cases scrapings from the sides of the test-tube mounted on slides often show the bacillus. The length of time necessary for search averages one hour, but thirty to forty minutes is generally rewarded by positive findings.

SURGERY OF THE LARGE BOWEL.

By Malvern B. Clopton, M. D., of the Editorial Staff.

1. Lane: Chronic Constipation; Surgical Treatment. (*Surg. Gyn. and Obstet.*, Vol. 6, p. 116, 1908.)
2. Mummery: Diseases of the Colon and Their Surgical Treatment. New York: Wm. Wood and Co. 1910.
3. Willms: Chronic Appendicitis, Coecum Mobile. (*Archiv fuer klin. Chir.*, Vol. 95, Part 3, p. 581.)
4. Klemm: On Chronic Appendicitis Without Crisis and Its Relation to Atony of the Cecum, Coecum Mobile and Similar Conditions. (*Archiv fuer klin. Chir.*, Vol. 95, Part 3, p. 558, 1911.)
5. Gerster: On Chronic Colitis and Pericolitis. (*Annals of Surgery*, Vol. 54, No. 3, p. 325, 1911.)
6. Binnie: Colonic Intoxication. (*Amer. Journ. Surg.*, Vol. 26, No. 1, p. 4, 1912.)
7. Bevan: Dilatation of the Large Bowel. (*Journ. Amer. Med. Assoc.*, Vol. 59, No. 2, p. 112, 1912.)
8. Crossen: Membranous Pericolitis. (*Surg., Gyn. and Obstet.*, Vol. 13, No. 1, p. 32, July, 1911.)
9. Jackson: Membranous Pericolitis. (*Surg., Gyn. and Obstet.*, Vol. 13, No. 1, p. 32, July, 1911.)
10. Connell: Ileocecal Adhesions, Lane's Kink, and Jackson's Membrane. (*Surg., Gyn. and Obstet.*, Vol. 13, No. 5, 1911.)
11. Chapple: A Consideration of Some Cases of Advanced Tuberculous Joints Treated by Ileocolostomy. (*Lancet*, Vol. 1, No. 17, 1911.)

In the past few years the cecum and large bowel have assumed a most prominent place in the mind of the profession, and the discussions of the disturbances that can be directly and indirectly traced to the abnormalities and displacements of these organs have developed such varied viewpoints that it leaves one very much at a loss properly to interpret the real significance of the lesions. The results of the investigations of many authorities give promise of later bringing a clear understanding of the proper significance of the disturbances and a hope that in some way remedial measures will be assigned to relieve certain of these conditions. Displacement of the abdominal viscera may be looked upon either as a fundamental defect, associated in the decadent individual with a universal asthenia and hysterical and neurasthenic manifestation, or the ptosis may be considered as due to a misuse of dress and a carelessness in habits of exercise and the proper care in eating and effective evacuation of bowel waste. Lane was one of the first insistently to contend that chronic constipation was due to some mechanical interference with

the gastro-intestinal tract. He believes the appendix may so drag and draw the cecum that there is distortion and stasis, or there may be a band that presses upon and constricts the cecum; or adhesions at the hepatic or splenic flexures or at the sigmoid may so obstruct that there is atony and distension behind them, or the band and kink at the ileocecal valve may cause an obstruction. If he recognized that division of these bands will not relieve the altered mechanics of the bowel, he recommended the removal of the cecum and colon with an anastomosis of the ileum and sigmoid, but now he does this extensive operation only rarely, but depends on the ileosigmoidostomy, in this way putting out of commission the cesspool that causes the chief intoxication. In this latter operation he states there is at times a certain amount of discomfort due to the collection of hard fecal matter in the cecum. To illustrate the advanced position that he holds, it is only necessary to recall that from Lane's clinic comes the suggestion that the colon be removed for advanced tuberculosis of the joints. Lane raised the question of the effect of chronic absorption from intestinal stasis upon the resistance to bacterial infection, and urged that constipation is a very common complaint in a large number of cases of tuberculosis; hence, he believes that the patient will have a better chance if the intoxication is relieved by ileocolostomy. Lane and Chapple since 1909 have selected those cases of joint tuberculosis that were considered almost hopeless; and in all their cases there has been a marked improvement in the general health, gain in weight, and the tubercular lesion has most definitely improved. They suggest before the lesions have advanced badly, if there are signs of intestinal intoxication, that ileocolostomy be done early. They believe that these cases prove the hypothesis that the route of infection of tubercular virus is via the intestine, that the lesion is only curable when reinoculation is prevented, and that advanced tubercular lesions can be cured if we remove the disposing cause.

Mummery takes a much less pronounced stand on the question of constipation. There is an undoubted "medical" aspect to the symptoms in his mind, and he advises the use of medicines and proper food and massage of the abdomen with gymnastics that strengthen the abdominal muscles. The cases that require operation are those in which the patient is getting seriously ill from autointoxication and the bowels cannot be made to act with the medical and physical aids. Appendicostomy is the best operative method to try, for the large bowel can be flushed daily and after a time regain its normal function; but in the meantime a marked general improvement in the patient's condition takes place and the autointoxication passes. The mortality of 33 per cent. in such a serious operation as resection of the colon makes it doubtful whether that operation is justified, and the drawbacks of fecal impaction in the occluded cecum make it questionable whether ileocolostomy should be performed. Of the adhesions and bands about the colon, Mummery speaks more of those about the sigmoid than those about the cecum, and in some instances has been able to diagnose through the proctoscope such bands outside the sigmoid as causing the twisting and angulation. These bands are at times of uncertain origin or they are due to inflammatory remains, and chronic volvulus is often caused by them.

Willms calls attention to a certain number of apparent chronic appendicitis cases which at operation show a normal appendix with a contracted mesoappendix. After operation the pain crises still persist, due to the

spasmotic contractions of the cecum which have their origin in the irritation of this organ brought on by chronic constipation. On palpation the cecum is felt distended with gas and there is often muscle spasm of the abdominal wall, and a tender point over McBurney's area which is characteristic even after the appendix has been removed. The radiograph shows the bismuth in the cecum even after twenty-four hours, and the bowel hangs low in the pelvis, and when the patient is rolled on the left side the shadow of the bismuth passes beyond the median line. The patient complains of habitual chronic constipation, with the intermittent attacks of diarrhea, and the colicky spasmotic pain is always located on the right side. To overcome this condition he has in many cases done a cecumpexy; and, by shortening the cecum, he has been able to relieve chronic constipation, and in over three-fourths of the cases operated on without other medication the bowels have moved normally.

Klemm believes that in those cases where chronic appendicitis has been diagnosed and the appendix removed, the reason for the continuance of distress is due to the atony of the cecum with dilatation, at times associated with stasis and catarrh of the colon. In such cases the cecum becomes much hardened and the musculature very insufficient, and he believes that cecumpexy is the correct operation.

Jackson, some years ago, called attention to a veil-like membrane which he had found covering the cecum in cases that he had operated on for appendicitis; and he believed that this membrane was the cause of colic and obstruction, and that by dividing it or removing it it was possible to relieve the constipation and the accompanying discomfort. Since Jackson's suggestion this matter has been taken up by numerous observers, and perhaps one of the best papers has been written by Gerster. He believes that the peritoneum reacts to the infectious processes, ordinarily associated with chronic colitis, by the formation of characteristic vascularized transparent membranes which take their origin along the external lateral aspects of the cecum, and the ascending colon and hepatic flexure on one side, the sigmoid flexure, descending and splenic flexure on the other. He describes this membrane in a general way as taking a line that runs parallel with the gut and often reaching to the inner reflection of the peritoneum, completely enveloping the intestines in a system of fan-like radiating bands, between which the thinner parts of the membrane are outstretched like webs. Except at the flexures, constriction by one or more thickened bands of membrane is rarely marked enough to provoke ileus-like symptoms. However, flexion of a laxed, unduly dilatated, abnormally movable portion of the gut upon the edge of such a strand may occasionally cause serious trouble. An eminently predisposing factor of chronic colitis is an undue retardation of feces. A congenital or acquired laxity of attachment, and a congenital or acquired redundancy of diameter or length of certain portions of the large intestine, may both be strongly predisposing and seriously aggravating factors in the development and course of the disease. He urges that chronic colitis can be prevented by restricting animal food and a generous use of vegetables to supply bulk. The graver aspect of the malady usually demands surgical intervention, but here, too, good results follow only if dietary and general hygienic measures are subsequently practised.

Bevan reviewing this subject is impressed with the multiform conditions that have entered into the discussion, and is inclined to believe

that we are likely to be led into attempting procedures that later experience will prove are not satisfactory. He thinks that Lane's teachings are too radical, and that removal of the entire colon or an ileocolostomy for constipation cannot be too severely condemned, nor does he believe that Willms' "coecum mobile" has any further basis for existence than the fact that it occurred to Willms as an idea which might explain the failures to cure certain cases he had operated for chronic appendicitis. He believes that mere mobility of the cecum cannot give more trouble than can a normal ileum or normal sigmoid. He does not believe that we have as yet accumulated enough data from the x-rays to determine pathological conditions accurately, nor to say that surgical interference ought to be used because after thirty-six hours bismuth still remains in the cecum. He believes in most cases medical aid will relieve. The surgical type of the condition is found where there is severe constipation, colitis, pericolitis, adhesions, colics, and obstruction. These are the cases which should be operated to remove the bands and membranes and, if necessary, make anastomoses and resections. In the minor cases in which adhesions are limited, it seems probable that permanent relief may be had in this way, by simply dividing the adhesion and protecting by normal peritoneum the raw surfaces formed. When the cecum and ascending colon are involved extensively, we should make a lateral anastomosis between the ileum and transverse colon. When the obstruction is at the splenic flexure, we should make an anastomosis between the transverse and the splenic colon, or between the transverse colon and the sigmoid. When the obstruction is in the sigmoid, a resection of the sigmoid, with union bilateral anastomosis, should usually be made. But an anchoring of the cecum, because it is movable, or a resectioning of the entire colon for constipation, should never be attempted.

SCOLIOSIS.

By NATHANIEL ALLISON, M. D., of the Editorial Staff.

1. Abbott: Correction of Lateral Curvature of the Spine. (*New York Medical Journal*, April 27th, 1912.)
2. Ashley: Abbott's Method of Correcting Fixed Lateral Curvature. (*New York Medical Journal*, April 27th, 1912.)

Abbott has made the statement, in an article published in 1911, that fixed lateral curvature of the spine will yield to treatment as easily as bowlegs or club-feet. In his present article he states that his increased experience leads him to believe that this deformity yields far more readily than either of the others. The two fundamental principles underlying the correction of this deformity are (*a*) overcorrection, for if motion is not established in all directions to the extreme of normal motion, the treatment is only palliative, and not curative; (*b*) fixation in the overcorrected position until the parts are so thoroughly stretched and changed in their shape that the deformity will not return. This has heretofore been impossible because improper principles were applied. The spine is a flexible body, and the deformity of lateral curvature is due to bending it in two directions at the same time, together with a rotation of the vertebræ included in the curve. Up to a certain limit this is a perfectly normal physiological position. It is not the posture that one takes when simply bending forward and, at the same time, to one side; rather, it is the position assumed by a person sitting obliquely at a desk writing, and one that may be produced by muscular effort, and which increases as the person tires.

Lateral curvature may be lessened by lateral traction and fixation, with spine in some other position, but the rotation remains unchanged, or it is often increased. Rotation is the worst feature of lateral curvature, for unless the vertebræ are turned back to their normal position, it is impossible to correct the deformity.

Lateral curvature is a simple deformity which can be easily created artificially, as easily corrected and again established in the opposite direction, with a very little disturbance of the patient. The patient, in order to do this, must be bent strongly forward, the low shoulder elevated, the high shoulder depressed, the bulging ribs drawn downward and forward and lateral traction made against the lateral curve while the plaster-of-Paris corset is applied.

Abbott gives a complete description of his apparatus for applying jackets in this manner and shows some remarkable photographs of changes in position secured in this way. Case histories are also given in detail. He states that the average length of time taken to produce complete overcorrection was three weeks; in some cases ten days was suf-

ficient, while in others it was necessary to continue the insertion of felt for six weeks.

Three factors must be taken into consideration: The age of the patient, the length of time since the beginning of the deformity, the size and shape of the body and the amount of flexion which can be made. He believes that it is easier at times to correct an adult patient who has a deformity of some years' standing than it is to accomplish the same result in a thick-set child, where the curvature is of recent development.

As the amount of rotation and its correction is the most important part of the deformity, it is not only very necessary to keep an x-ray record of the original curve, but it is also important to make frequent skiagrams of the changes which follow. When the corset is finally removed, it is very necessary to have the patient where constant treatment by exercises and massage may be carried out. It is desirable in nearly all cases to use a light brace which will hold the spine in an overcorrect position. This is to prevent the recurrence of the deformity, which may reappear, as it does in club-foot, unless prevention is carried out.

This work of Abbott's is the most important work that has appeared on this subject. It throws an entirely new light on the treatment of scoliosis which has long been the *bête noire* of orthopedic surgery.

Ashley gives his conception of the technique of the Abbott treatment of scoliosis. He states that all his patients have progressed in the new jackets, and that he was convinced beyond doubt of his ability to accomplish the same results that Abbott accomplished. He, however, has had difficulty in maintaining his patients in the Abbott jacket, on account of the pain caused by the position. A more thorough understanding, however, of Abbott's methods leads him to believe that Abbott will brand as inefficient and harmful many of the mechanical appliances, braces and exercises now in use. He considers the reduction of severe cases to rank in importance with major operations, and the discovery of Abbott to be one of the greatest advances of orthopedic surgery.

RECENT VIEWS UPON SPOROTRICHOSIS.

By M. F. Engman, M. D., of the Editorial Staff.

1. De Buermann and Gougerot (*Archiv fuer Derm. und Syph.*, Bd. CX, p. 25, 1911).
2. Adamson (*British Journ. Derm.*, p. 239, August, 1911).
3. Arndt (*Derm. Zeitschr.*, Hefte 1 and 3, 1910).
4. Chipman (*Journ. Cutan. Dis.*, p. 33, June, 1912).
5. Menaham Hodara (*Archiv fuer Derm. und Syphil.*, Vol. CX, p. 387, 1911).
6. Menaham Hodara and Faud Bey (*Derm. Wochenschr.*, p. 45, January 13th, 1912).

It is curious to notice in the progress of medicine how frequently certain conditions prove to be distinct entities which were formerly considered members of a large group. For instance, certain granulomatous conditions of the skin, like blastomycetic dermatitis, due to a fungus, were formerly considered either tuberculosis of the skin, or syphilis, and in most instances, especially the latter, when the disease improved rapidly under any solution containing iodine. Hence, when mixed treatment was given for the supposedly syphilitic process, the diagnosis was apparently confirmed by the improvement in the lesions. Sporotrichosis is even a more striking illustration of the above described occurrence than blastomycetic dermatitis, as it is due to a fungus and is rapidly improved or cured by a mixture containing iodide of potash, or any other iodine preparation. The lesions of sporotrichosis may be mistaken for syphilis, tuberculosis, chronic glanders, or any of the other infectious granulomata of the skin. Although this disease was first described by Schenck in 1900, and later by Brayton, it was not thoroughly introduced or recognized until the description of de Buermann in 1903. Since that time the literature contains many thorough studies of the condition. De Buermann and Gougerot described three groups of this disease from the standpoint of topography and morphology—namely, (1) disseminated hypodermic gummata with associated skin lesions; (2) localized hypodermic gummata—gummatous lymphangitis, with or without initial chancre; (3) all the extra-cutaneous forms involving mucous membranes, bones, muscles, viscera, etc.

Pathologically, the same authors described three types: (*a*) a lympho-connective tissue or syphiloid type; (*b*) an epithelioid (with giant cells) or tuberculoid type; (*c*) a polynuclear or ecthymatiform type. In short the lesions sometimes show the characters of tuberculosis, sometimes of syphilis. The parasite has been found free in nature by Gougerot in the French Alps, and here, as in human lesions, it presents spores and mycelia. It is difficult to find the parasite in the pus and tissues. It is best demonstrated by culture and by animal inoculation. The organism grows best upon Sabouraud's glucose-peptone gelatine. These tubes

may be left in an ordinary warm room and on the fourth or fifth day the sporotrichium develops.

It seems that the parasite probably originates in the vegetable debris which might come in contact with the skin or mucous membranes. In the majority of instances the initial lesion begins upon one of the fingers and slowly extends up the arm in the form of subcutaneous abscesses connected by a chain of lymphangitis. These abscesses finally break down, suppurate, and discharge, either having the appearance of multiple gummata or tuberculous lesions. The infection may take place also from rats or horses. Hyde's cases are interesting in this respect. The disease may last for months or years untreated, or may become systemic. Under treatment, brilliant results are usually obtained by the use of one of the iodides internally, assisted by local application of some iodide preparation. Incision and drainage of all the lesions are, of course, likewise indicated.

Arndt published the first case of sporotrichosis detected in Germany, and one reading his paper can easily realize the difficulties of the diagnosis of certain cases. In his case the diagnosis was arrived at by process of elimination, and was substantiated by the growth of the fungus upon culture media. Arndt thinks that the best clinical classifications are the "regionally limited" and "disseminated" forms. He states that the primary lesion of the disease sometimes resembles a tuberculous lesion, sometimes a kerion, and may be mistaken for the lesions produced by the iodides or bromides. Again, it may be mistaken for a blastomycosis. Arndt thinks there are histological resemblances between sporotrichosis, blastomycosis and deep-seated ringworm, and that the only satisfactory method of making the diagnosis is by culture; and if that be negative, by the test of the power of the patient's serum to agglutinate the spores of the fungus. Dissemination of the fungus takes place either by means of the lymphatic channels or by the blood, the latter being the most frequent means producing a phlebitis. Infection may take place through the alimentary or expiratory tract, which may be illustrated by the interesting case of Hodara. In Hodara's case (a doctor), the disease began while the patient was in good health, the first symptoms noted being fatigue and tendency to perspiration, followed by fever. Four days after the commencement of his illness he had severe pain in the right side and back followed by vomiting. Pleurodynia was thought of, Malta fever, and other general conditions. At the end of the second month an orchitis began, first on one side and then on the other. At the seventh month, ocular symptoms set in, beginning with an episcleritis, followed by iritis, which lasted several months. There was ulceration of the tonsils and a papulo-necrotic eruption which resembled tubercular lesions or papular syphilides. The eruption lasted for sixteen months. From one of the lesions a culture of the sporotrichia was obtained, which cleared up the diagnosis.

Hodara and Faud Bey also report 3 cases occurring in the same family, in which all the lesions were limited to the skin.

It is interesting to note that in 1910 de Buermann and Gougerot reported a similar disease to sporotrichosis, which was produced by another form of fungus which they called "hemisporosis." They believe the cases to constitute a symptom-complex new and distinctive. Multiple or single gummata, with central necrosis and softening, are characteristic of this disease as of sporotrichosis. The preparations of iodine have here also their curative effect. Culturally the organism is different from the sporotrichia of Schenck.

DIAGNOSTIC AND THERAPEUTIC NOTES.

ADRENAL INSUFFICIENCY IN TYPHOID FEVER.—Sergent (*Gaz. des Hôp.*, July 4th, 1912). Sergent believes that one of the characteristic features of typhoid fever is an insufficient activity of the adrenals. The asthenia, the low blood-pressure, the small pulse, he thinks, are expressions of this phenomenon. These signs are exaggerated in the severe adynamic forms of the disease and attain their maximum in these cases in which the sudden prostration simulates hemorrhage or perforation. In all these cases, prompt amelioration follows the administration of adrenal substance.

These observations lead the writer to advocate the systematic administration of adrenal substance in typhoid fever. The most unpromising cases present a better prognosis if adrenal medication is added to the received methods of treatment.

TREATMENT OF CHRONIC NEUROSYPHILIDES.—Browning and Lintz (*New York Med. Journ.*, July 20th, 1912). The writers report exceedingly good results, in tabes and the allied syphilogenic disorders, from the hypodermic injection into the patient of his own spinal fluid obtained by lumbar puncture. The theoretical considerations upon which the procedure is based need not be discussed here. Their case reports are of much interest. Advanced cases of tabes, re-injected with their own spinal fluid, improved surprisingly, especially as regards intestinal peristalsis and the ability to walk. The method may also have diagnostic value, since the 2 cases, in which no improvement resulted, both turned ·out to be non-syphilitic.

DIABETIC COMA.—Chauffard and Rendu (*Rev. de Méd.*, No. 6, 1912). The writers believe that diabetic coma is due, not to protein intoxication nor to acidosis, but to the intense dehydration of the body occasioned by the long-continued polyuria. The increased viscosity of the blood, characteristic of this complication, lends support to their view. Their discussion is not only of theoretic but also of therapeutic importance, since, if their views are correct, the treatment of diabetic coma should be directed, not so much towards elimination nor towards the reduction of acidosis, as to the introduction into the system of large quantities of water. They advise the intravenous administration of hypotonic or even isotonic solutions, a litre at a time. They report good results from this treatment.

THE DILUTION TEST IN THE PROGNOSIS OF NEPHRITIS.—Goldberg (*Zentralbl. fuer inn. Med.*, No. 19, 1912). The writer recommends this test as a convenient method of determining the gravity of a nephritis. The patient takes his last meal between 6 and 7 p. m. The next morning at 6:30, having emptied his bladder, he drinks a pint of water. Until 1 p. m. nothing further is swallowed and the urine is collected, measured and weighed every half hour. In health, the entire pint of water is excreted within three hours, with a low specific gravity only during the

first hour. In simple albuminuria and in the mildest grades of nephritis, the same observation is made as in health. In severe nephritis, the period required for the excretion of the water is prolonged and the specific gravity of the resulting urine is persistently low. We are warned, however, that in using·the test for the prognosis of nephritis, the entire clinical picture must be taken into consideration.

FACTORS OF SAFETY IN OPERATIONS FOR EXOPHTHALMIC GOITRE.— Mayo (*Journ. Amer. Med. Assoc.*, July 6th, 1912). Within the past year the Mayos have operated on a consecutive series of 278 cases without a single death. This the author believes is due to taking advantage of the so-called "factors of safety." These are given as follows: (1) As regards operating during periods of exacerbation or excessive activity of the disease; the mortality in these cases is frequently high; one should employ in these cases only the medical treatment, *i. e.*, rest, *x*-rays, etc., with attention to the heart, stomach and intestines according to the indications presented by the individual case, until the exacerbation of symptoms subsides. (2) Gastric crises and acute delirium are serious manifestations and operations should not be done until the conditions have subsided. (3) Dilatation of the heart which exceeds 1 in. is a serious condition, while that of 1 1/2 in. will give a percentage of unavoidable mortality for the radical operation of thyroidectomy. (4) Ligation, as a method of surgical treatment, has an accredited position in the treatment, and in the early stages patients are sometimes wonderfully improved by simple double ligation. (5) Serious risks are treated by a single ligation of the vessels at the upper left pole. The reaction is about three-quarters as severe as from a double ligation, but the missing one-fourth is an element of safety. If the reaction be very severe a second ligation of the right upper pole is made a week later and the reaction following this is slighter. If it is not severe at this second operation the right lobe, isthmus, and possibly a portion of the left lobe are removed. Thyroidectomy of three-fifths or more of the gland is indicated in most chronic cases in which dilatation of the heart does not exceed 1 in. and in which there are no complications. Ether preceded by atropine and morphine is the anesthetic of choice; but, if there is extreme nervousness, scopolamine is used, and the worst type of cases with heart and kidney disease is operated on with local anesthesia or has the benefit of Crile's preparation—injecting a local anesthetic into the operative field in addition to the other preparations before ether is given.

BENEDICT'S TEST FOR SUGAR.—Myers (*Muench. med. Wochenschr.*, ·No. 27, 1912). This test is finding widespread use in this country, but its excellence warrants our calling attention to it here. The qualitative solution is prepared as follows:—173 gr. sodium or potassium citrate and 200 gr. crystallized (or 100 gr. anhydrous) sodium carbonate are dissolved in 800 c.cm. boiling water. This is cooled and filtered, whereupon 17.3 gr. copper sulphate, dissolved in 100 c.cm. water, are added and the whole diluted to make one litre. The solution is used like Haines' or Fehling's fluid, but is at once more sensitive to sugar and less so to other reducing substances. Its increased sensitiveness is due to the fact that the sodium hydrate of the other methods destroys part of the sugar, whereas the milder alkalies of Benedict's solution do not. The solution is also unusually stable. A slight alteration of the formula results in a quantitative solution by means of which the amount of sugar in the urine can be conveniently and accurately estimated.

ESTIMATING VENOUS PRESSURE.—Frank (*Zeitschr. fuer exp. Path. und Ther.*, Vol. 10, No. 2). The sphygmomanometer with its arm-band is attached to the upper arm in the manner usual for blood-pressure determinations. A similar arm-band is attached to the forearm and registers changes in the volume of the latter. The pressure in the sphygmomanometer, that just suffices to produce a swelling of the forearm, marks the degree of venous pressure.

IONIC THERAPEUTICS.—Zimmer (*Med. Klinik*, No. 25, 1912). A variety of disorders, the writer believes, are caused, or at least aggravated, by the presence in the blood and in the tissues of an undue concentration of sodium ions. This is especially the case in edema, in effusions and in nephritis. The treatment advocated consists in irrigating the bowel with large quantities of sodium-free, hypotonic solutions. These have a strong affinity for the sodium ions and aid in their removal from the body. The writer uses for each irrigation 30 litres of water in which are dissolved 3 gr. each of potassium and calcium chlorides. Excellent results are reported in pleuritic effusions and in tuberculous ascites, and it promises also to be useful in acute nephritis.

THE TONSILS IN NEPHRITIS.—Eppinger (*Wien. med. Wochenschr.*, No 24, 1912). Eppinger believes that old tonsillar infections are more frequently the cause of acute nephritis than is generally recognized. In 3 cases of obstinate nephritis, following an angina, the tonsils, which appeared swollen and ragged but otherwise normal, were extirpated. Their interior was found full of tiny pus-collections. In all 3 cases, the signs of nephritis promptly ceased after the tonsillectomy.

A NEW METHOD OF EXAMINING SPINAL FLUID.—Braun and Husler (*Deutsch. med. Wochenschr.*, No. 25, 1912). A very simple test for distinguishing the spinal fluid obtained by lumbar puncture in meningitis from that obtained in other diseases has been worked out by Braun and Husler. The reagent consists of $\frac{N}{300}$ hydrochloric acid (one part of normal hydrochloric acid + 299 parts distilled water). This is added to 1 c.cm. of the lumbar puncture fluid, 1 c.cm. of the reagent being added at a time, shaking after each addition. If no turbidity results even after adding 5 c.cm. of the reagent, the test is negative. Over 40 lumbar puncture fluids were so tested. It appeared that the spinal fluid in meningitis, especially if tuberculous, always gave a positive reaction. Three cases of paresis gave a very feebly positive reaction. All others were negative.

This test will obviously prove very useful if further study confirms the uniformity of its results.

VERONAL IN SEA-SICKNESS.—Gerson (*Muench. med. Wochenschr.*, No. 14, 1912). In his experience as ship's surgeon the writer has found nothing so useful for sea-sickness as veronal, especially in its more soluble form as veronal-sodium. He states that the nausea can almost always be prevented if those who know themselves to be subject to this affliction take 0.5 gr. at bedtime for the first few days of the journey. Even after they are actually sick, however, the administration of the drug is followed by an amelioration of the symptoms.

CORRESPONDENCE

PARIS LETTER.

OXALEMIC GOUT OF THE STOMACH.

By Auguste A. Housquains, M. D.

The obscurity which has obtained since many years in connection with the pathogenesis of gastric diseases seems to be on the point of disappearing, due to the light which is being thrown on the subject by the numerous investigations which have been undertaken in the course of the last few years. Without doubt, many of the obscure points are not as yet elucidated, but it seems that a beginning has been made to pave the way to the possibility of a more rational interpretation and classification of the troubles which affect the stomach.

Although we know that some affections are due to defective alimentation and to the direct irritating action of a certain number of substances, we are rarely authorized to isolate, as definite entities, the diseases of the stomach. In the majority of cases the troubles of the central organ of digestion are stomachic manifestations of disturbances of the general system. We are aware to-day of the preponderant rôle that the nervous system plays in the production of the disturbance which we call gastroneurosis. These ideas have become classic. At the present hour the tendency is to emphasize more and more the influence of the dyscrasias of the blood on the pathogenesis of dyspepsias, and the rôle of certain toxemias, especially observed in the course of chronic nephritis, is beginning to be well known.

Of the number of toxemias which are susceptible of altering the function of the stomach, it is necessary to attribute an important part, it seems, to organic intoxication by oxalic acid. This intoxication, it should be understood, is not a question of the consecutive troubles due to the accidental ingestion of oxalic acid, either with or without criminal intent, but of the many dyspepsias which can be secondary to oxalemia —that is to say, the accumulation of oxalic acid in the blood and in the tissues, no matter what its origin may be.

In the course of his numerous experiments, and notably in his lectures on the pathology of digestion, M. Maurice Loeper has shown clearly the relation of the histology and symptomatology of oxalemia to the digestive disturbances. Without doubt, says this author, this is not a question of a real diathesis, since the oxalic diathesis is still debatable, but there is an autogenetic intoxication by oxalic acid which causes many nutritive disturbances and many organic alterations. The stomach seems to be the organ with predilections for the reactionary manifestations resulting from an excess of oxalic acid in the blood.

From the clinical point of view, the disturbance which is called oxalemic gout of the stomach does not manifest itself suddenly. On the contrary, during a protracted period, there are vague disturbances of general fatigue, of loss of appetite with nausea; at a certain period

the troubles are those of a latent intoxication affecting, in a diffuse fashion, all the organs of the economy. The subjects of these disturbances are arthritic, having already presented vague pains, neuralgias, arthropathies, and may have had manifestations of slight uremia with migraine or hemorrhages. Moreover, in certain cases there may be a form of lithiasis which M. Loeper calls "oxalic lithiasis of the intestine"; then one day there is a real, genuine gastric access. This access may be one of three kinds: dyspeptic, gastralgic, or hemorrhagic. The first is undoubtedly the most frequent. It is necessary to state here that a number of authors consider recurring oxaluria as a consequence in these cases and not the determining cause of the dyspepsia. The disturbances are those of a flatulent dyspepsia, with wind on the stomach after eating, epigastric heaviness, somnolence, alternating constipation or diarrhea, and lumbar pain. The urine contains oxalic acid, and alimentary or mucous vomiting occurs in a more or less regular manner.

The gastralgic form may appear early or late. In other words, it occurs at the beginning or end of digestion, according to whether it is due to the reaction of the musculature of the stomach or to a spasm in the pyloric region. Often this gastralgia occurs at any hour and manifests itself by cramps, sometimes so intense that they resemble a pancreatitis or an abdominal tabes; there is a sensation of constriction, of clawing, of tearing, with radiations in the back and in the intercostal spaces; the constipation is marked, and when there is vomiting it is more often watery than alimentary. The acidity of the gastric juice is not increased; the urine is small in quantity and dark. The arterial tension is low, and there is no elevation of temperature; on the contrary, the temperature is below normal.

The third is the hemorrhagic form. M. Loeper has observed 3 cases of hemorrhage which were clearly oxalic. The beginning of this affection is characterized by painful spasms which recall the clinical picture of gastric ulcer. The hemorrhage is small in quantity, frequent, blackish, without influence on the pain. In the blood thus expelled there are present crystals and even little calculi of oxalate of lime. When the acute crisis is over—the termination occurs at varying periods and often in a sudden manner—the patients have an abundant polyuria with an oxaluric deposit. Sometimes nephritic colic occurs during the elimination of oxalophosphatic calculi and even in intestinal lithiasis.

These different forms of gastric oxalemia do not, ordinarily, portend a grave prognosis. Even in the case of hemorrhages, cure is the rule. There is, in fact, no tendency to perforation, but often there is a simple erosion which does not alter, to any great extent, the gastric parietes.

M. Loeper states that when the localization of the disturbance is at the *niveau* of the duodenum, the prognosis may be very grave.

The diagnosis of the oxalic crisis of the stomach is relatively easy if one takes care to proceed to a careful examination, after differentiation, of dyspepsia, simple ulcer, gastric tabes, pancreatitis and cancers of the middle part of the pancreas. The diagnosis, of course, should rest on the knowledge which the laboratory yields. Without doubt, the analysis of the gastric juice reveals no chemical modifications, but the presence of red corpuscles, leucocytes, the debris of granular epithelium are arguments in favor of an ulceration. If oxalic crystals are found in the filtered blood, one can affirm that the nature of the erosion is of oxalemic origin. Synchronous with the gastric troubles—

and this is one of the signs upon which M. Loeper delights on insisting —a concomitant oxalic intestinal lithiasis may often be observed.

Oxaluria, in the course of these crises, has been noted by a number of authors. It is necessary to remark that a diminution in the oxaluria may take place during the disease, although after the crisis an excess is again apparent.

The pathological anatomy of oxalemic gout of the stomach is, so to say, an unknown quantity. An autopsy on the subjects of these crises not being feasible, it is impossible to determine what are the lesions that correspond to the crises in question.

The histological examination of the fluid after lavage of the stomach indicates the presence of a profound alteration or an erosion of the mucous membrane. M. Loeper's experiments have proved that oxalic acid is eliminated in part by the mucous membrane of the stomach. The animal poisoned by this acid showed evidences on the surface of the stomach much more often than on the surface of other organs. In making the injections into the blood-stream punctated erosions on the surface of the stomach were observed. But the oxalic acid thus injected lodged even in the abdominal plexus and in the solar ganglion, where a histochemical examination disclosed its presence.

To be definite, the gastric crisis is nothing else than the result of a gastritis of elimination, recalling by its mechanism the consecutive attacks of gastritis occurring in nephritis.

The therapy ought at first to envisage the acute phenomena of the gastric access. The application of ice to the epigastrium, anodyne potions of divers alkaloids which are in use, lavage consisting of solutions of sodium bicarbonate, milk diet and the vegetable bouillons are the principal elements of the therapy in the acute attack. When this phase of the disturbance is over, it is indispensable to place the patient on a diet that is as free as possible from oxalic acid; spinach, sorrel, rhubarb, chocolate, mineral water, condiments, wine, tea and coffee should be interdicted. The basis of the alimentation ought to consist of a milk diet, purée, potatoes, cereals, rice and stewed fruit; lemons and oranges are decidedly indicated. If meat is an item of diet, only mutton, beef and chicken should be allowed; veal, game, salt-water fish, sweetbread, and, in general, all the viscera which contain a notable quantity of purins and oxalic acid are to be excluded.

As regards treatment, the object ought to be to transform the absorbable and soluble oxalates into insoluble oxalates of lime. To accomplish this, recourse should be had to sodium bicarbonate, magnesium and calcium carbonates. Saline purgatives in broken doses should be administered; sodium and magnesium sulphates are particularly advisable. All the diuretics are useful in that they favor the renal elimination of oxalic acid. Finally, a strict hygiene should be insisted upon with moderate exercise.

It is by this ensemble of therapeutic means that at intervals there is an amelioration or even a complete cessation of the crises of oxalemic gout of the stomach. ,

To sum up, it can readily be seen that while the local manifestations should receive attention, what is absolutely necessary is to attempt to modify the general condition. But that which is true in regard to disturbances of all organs is still more applicable, it would seem, to the stomach; and it can be asserted that above all, while treating the oxalic toxemia, the cure of the oxalic crises of the stomach is of paramount importance.

August 10th.

BOOK REVIEWS.

A MANUAL OF SURGICAL TREATMENT. By Sir W. Watson Cheyne, Bart., C. B., D. Sc., LL. D., F. R. C. S., F. R. S., Hon. Surgeon in Ordinary to H. M. the King; Senior Surgeon to King's College Hospital; and F. F. Burghard, M. S. (Lond.), F. R. C. S., Surgeon to King's College Hospital, and Senior Surgeon to The Children's Hospital, Paddington Green. New Edition. Entirely Revised and Largely Rewritten with the Assistance of T. P. Legg, M. S. (Lond.), F. R. C. S., Surgeon to the Royal Free Hospital; Assistant Surgeon to King's College Hospital and Arthur Edmonds, M. S. (Lond.), F. R. C. S., Surgeon to the Great Northern Central Hospital, Surgeon to Out-Patients, The Children's Hospital, Paddington Green. In Five Volumes. Vol. I. The Treatment of General Surgical Diseases, including Inflammation, Suppuration, Ulceration, Gangrene, Wounds and their Complications, Infective Diseases and Tumors, Deformities. With an Appendix upon the Administration of Anesthetics by Dr. Silk, and the Examination of the Blood, by Dr. W. D'Este Emery. Vol. II. Skin, Subcutaneous Tissues, Nails, Lymphatic Vessels and Glands, Bursae, Muscles, Tendons and Tendon Sheaths, Nerves, Blood-Vessels, Bones. Philadelphia and New York: Lea and Febiger. 1912.

In the first volume of this work we find the important features of Volumes I and II of the first edition, which were published in 1899. In reducing the size of the work there is an advantage, as much needless repetition is spared, but the work as represented by this volume shows that further revision would not be amiss.

The chief usefulness of this treatise appears to call attention to the differences between surgery as practised at King's College Hospital and surgery elsewhere. Our catgut is no longer prepared by Lister's method. Marine sponges are curiosities in operating-rooms, and we have long since passed beyond antiseptic surgery; but these methods are recommended in this volume, a large part of which is devoted to a description of the surgical technique which the authors use and recommend. The reader will be surprised to learn in connection with anesthesia that nitrous oxide is only used for minor dental operations and that the combination of nitrous oxide with oxygen is decried because of the cumbersome apparatus and because "unpleasant after-effects are more likely to follow." This is an example of the great difference between the universal and the King's College Hospital practice. On the whole, the book is well written, but not sufficiently rewritten since the first edition.

The second volume is more satisfactory than the first. The section on the arteries and aneurysm is notable, but elsewhere there is a lack of completeness, much that is valuable in each discussion being casually, if at all, remarked. This noticeable lack makes the volume much less valuable than the rather comprehensive plan of the work would lead one to expect. The section on fractures is a good guide and up to a standard that is usually found in "systems" of surgery. Affections of the nerves are well considered.

TEXT-BOOK OF OPHTHALMOLOGY. By Dr. Ernst Fuchs, Professor of Ophthalmology in the University of Vienna. Authorized Translation from the Twelfth Revised and Greatly Enlarged German Edition with Numerous Additions by Alexander Duane, M. D., Surgeon Ophthalmic and Aural Institute, New York. With Four Hundred and Forty-one Illustrations. Fourth Edition. Philadelphia and London: J. B. Lippincott Co. Price, $6.00.

The translation constituting the fourth American edition has been prepared by Dr. Duane from the 12th (German) edition of Prof. Fuchs' celebrated book. A whole new part, constituting a general introduction to the work, considers the general physiology of the eye and the pathology, etiology, symptomatology and treatment of eye diseases as a whole. New paragraphs and a number of new il-

lustrations have been added. As in former editions, Dr. Duane has added important sections on functional examination, motor anomalies, refraction and operations. One with a knowledge of the scholarly attainments of the translation is not surprised to find that the English text is highly literary and wholly free from suggestion of the German idiom.

OPERATIVE OBSTETRICS INCLUDING THE SURGERY OF THE NEWBORN. By Edward P. Davis, A. M., M. D., Professor of Obstetrics, Jefferson Medical College; Obstetrician to the Jefferson Hospital; Obstetrician and Gynecologist to the Philadelphia Hospital; etc. With 264 Illustrations. Philadelphia and London: W. B. Saunders Company. 1911. Price, $5.50.

The improvement of many of the old and the introduction of many entirely new obstetric operations within the last decade has led to a thorough revision of views concerning the indications for and contraindications against almost every known obstetric operation. A clear description of the technique and of the limits of usefulness of every surgical procedure as suggested and practised to-day by the leading obstetricians of the world, therefore, must be regarded a very timely and welcome contribution to medical literature.

THE HOME NURSE'S HANDBOOK OF PRACTICAL NURSING. A Manual for Use in Home Nursing Classes in Young Women's Christian Associations, in Schools for Girls and Young Women, and a Working Text-Book for Mothers, "Practical" Nurses, Trained Attendants, and all who have the Responsibility of the Home Care of the Sick. By Charlotte A. Aikens, Formerly Director of Sibley Memorial Hospital, Washington, D. C., etc. etc. Illustrated. Philadelphia and London: W. B. Saunders Company. 1912. Price, $1.50.

In brief space the authoress has brought together the essentials of nurses, both as they interest the woman intending to care for the sick as her life-work and as they appeal to the wife and mother. The physician will find it an excellent little volume to place in the hands of his patients, especially mothers. Not the least of its merits is a chapter of recipes for palatable and easily digested dishes.

TEXT-BOOK OF EMBRYOLOGY. By Frederick Randolph Bailey, A. M., M. D., Formerly Adjunct Professor of Histology and Embryology, College of Physicians and Surgeons (Medical Department of Columbia University), and Adam Marion Miller, A. M., Instructor in Anatomy, College of Physicians and Surgeons (Medical Department of Columbia University). Second Edition. With Five Hundred and Fifteen Illustrations. New York: William Wood & Co. 1911. Price, $4.50.

Among all the many works on embryology designed for the needs of the students probably none is quoted more often in recent writings than this volume prepared by Bailey and Miller. Its well-deserved popularity is now attested by the issuance of a second edition, which only slightly varies from the first.

SURGICAL CLINICS OF JOHN B. MURPHY, M. D., AT MERCY HOSPITAL, CHICAGO. Volume I. Numbers 1-2-3. Octavo of 291 pages, illustrated. Published Bi-monthly. Philadelphia and London: W. B. Saunders Company. 1912. Price, per year: Paper, $8.00; Cloth, $12.00.

One reads with interest these dissertations of Dr. Murphy, which cover a range of subjects that gives full opportunity to expound on many branches of surgery. Although it would be well to have the editing of his remarks a little more carefully done, they might be robbed of some of the superlative and extravagant expressions that make the clinic of Dr. Murphy one of the most entertaining but at the same time instructive teaching places in America.

UEBER ORGANOTHERAPIE. Von Prof. Augusto Murri. Autorisierte Uebersetzung von Dr. Hermann Simon, Karlsbad. Wuerzburger Abhandlungen aus dem Gesamtgebiet der practischen Medizin. XII Band. 1 Heft. Wuerzburg: Curt Kabitzsch. 1911. Price, paper, M. 0.85.

This is a translation into German of an address delivered in November, 1910, before the medical society of Triest. In it the author reviews critically the development of organotherapy from its beginnings up to the present time.

EDITORIAL.

ON THE ADVANTAGES OF HAVING SYPHILIS.

When we recall all that has been told us by medical men, and by sociologists who flirt with medicine for the dubious glamor of reflected glory, about the disadvantages of having syphilis—what have not been the scoldings, the outcries, the gloomiest prognoses!—it is with a sense of relief that we read, every now and then, that this dread disease has certain good points in that it may be the means of adding to a talented man's brilliancy or—and this is an altogether different matter—stand a criminal in good stead to free him from the clutches of the law. That talented men such as Guy de Maupassant, Schumann, Nietzsche and others really did their best work, their most unusual work, under the stimulus of a mental exhilaration brought on by syphilis—this period invariably preceded the collapse—has been known for some time; and though the writer of these lines would be the last person to advocate the acquisition of syphilis by men of talent so as to increase their fertility of thought or exalt their special talent to outbursts that are bewildering to lookers-on, it may nevertheless be allowed him to say, that considering the low depth to which our American poets, novelists, philosophers and painters have fallen, an attenuated amount of the virus might make us just a little prouder of our present-day artistic achievements. But syphilis, as we all know, is a very democratic disease, at least in this country; therefore, to attempt to apportion it, so that the weight of the balance would be on the side of the intellectually elect, would not only be impossible, but would be doing another class of individuals—criminals on trial for murder—a great wrong, since in their case a deprivation would make the trip from the dock to the gallows so commonplace that medical science could not possibly act as a beneficent obstruction.

What has just been said may strike the reader at first as a bit of raillery that is ill-placed in a medical journal of sober thought; but on reflection and, especially after being enlightened as to the latest occurrence in a criminal court, he must perforce admit that there is at least one, if not two grains of truth in the foregoing statements. Reference is here made to the Paterno trial in Italy, which has recently been concluded. If there was in the criminal annals of any country a cold-blooded, premeditated murder, it was without doubt the killing of the Countess Giulia Tregona at a fifth-rate hotel in Rome, by a cavalry officer and a baron, whose motives were as low and sordid as are usually attributed to the dregs of society when selfishness and passion combine to impel to murder. Yet Professor Maiano, the psychologist called for the defense, talked eloquently on the prisoner's history of syphilis, and advanced the plea that, on account of having had the disease, his mental status was such that with him there was a complete subversion of the social order—hence the crime. But despite the learned professor's eloquence, or perhaps on account of his eloquence which took but small note of the glaring facts patent to the unprejudiced, Lieutenant Paterno was found guilty and sentenced to the maximum penalty.

It may be asked here, Why should syphilis, which throughout its history has been the bugbear of all civilized folk, at last be dragged into public view to explain either the brilliancy of a literary man or the problematic reason why a man, whose life has been that of a rake, was driven to murder? The answer to this question is not difficult, since it must be evident to all physicians that though we may know how to combat the various manifestations which are patent to the eye, the disease is still one of mystery as regards its unexpected and unexplained ramifications into all sorts of corners of our organisms at times when these organisms are outwardly quite normal. And since this mysterious note still attaches to this disease, would it not be foolhardy not to explain things which are not of daily occurrence—the writing of exquisite prose or poetry, or the murder of one's mistress—on the ground that our humdrumness of life, our stodgy intelligence, really require this fillip to make us—provided we start out in life with a goodly measure of brains—the equal of those choice spirits whose lives proclaim a mysterious force that passes understanding? Thus without undue ratiocination it can be seen that syphilis, while not to be courted, is not a disease to be too greatly decried; for if once this is done our psychologists and medical critics of literature will be at a loss to explain Shakespeare's plays—Shakespeare, by the way, has come into his syphilitic own, according to a debate carried on at the

last meeting of the Royal Society of Medicine—or the act of an individual dressed not in fustian but in linen of the finest weave, who sees fit to use a deadly instrument on the person who has excited his ire or jealousy.

THE MUNICIPAL HOSPITAL SITUATION IN ST. LOUIS.

The ordinance which regulates the St. Louis City Hospital management calls for the appointment of a visiting staff of physicians by November 1st; and yet up to the time of the issue of this number of the JOURNAL the Hospital Board has been unable to decide upon the exact method of reappointing the staff. This indecision and delay would not be a subject for either comment or criticism were it not for the facts that the problem confronting the Board is not essentially a difficult one, that the management of numerous other city hospitals furnish excellent practical precedents, and that the Board has before it a carefully planned and efficient scheme, by the adoption of which it can supply the hospital with a co-ordinated staff of medical men. The failure of the board to agree upon this measure points indubitably to the conclusion that the hitherto suspected lack of solidarity in the Board is indeed a fact and not a suspicion.

As constituted at present the Visiting-Staff of the City Hospital has proved both its own efficiency and the merits of the visiting-staff idea. During two years of activity the staff has demonstrated the falsity of all arguments that medical men in St. Louis could not be depended upon faithfully to care for the city poor. Two years of experience, however, has also demonstrated a looseness of staff organization and a diffusion of medical effort and activity which have militated against securing the greatest possible efficiency.

The plan before the Board for adoption, which aims at remedying these defects, consists essentially in the division of the various hospitals into definite services. The City Hospital is to consist of twenty-nine services, divided as follows: Nine medical services, nine surgical services (five services devoted to general surgery and four to gynecology and urology), two obstetrical services, three neurological services, one children's service, one skin service, one eye service, one ear, nose and throat service, and one orthopedic service, in addition to a few beds in several different wards for emergency medical and surgical service. For each of these services there is to be appointed a Head-Physician or Surgeon, thus creating a staff of twenty-nine attending physicians and surgeons. Each one of these men is to nominate an associate, who after approval by the Hospital Board is to be appointed on the Visiting-

Staff. It is the idea of the framers of the plan that faithfulness in the performance of their duties by present members of the Visiting-Staff shall constitute an important factor in making reappointments on the new staff.

In addition to this the new plan calls for the appointment of three additional Resident-Physicians, at a salary of $100 a month, selected from the men who have served two years on the interne staff, and who have displayed efficiency and capacity. These four Resident-Physicians are to be placed in charge of the surgical, medical, obstetrical and observation departments of the hospital. Furthermore, the plan looks to a longer continued service for the interne staff.

The adoption of such a plan would insure the selection of a sufficiently large Visiting-Staff to fulfil all the duties imposed upon them by their service; it would guarantee a continuity of service throughout the year; and it would automatically so place responsibility that it could in no way be shifted, thus guaranteeing to every patient, in most practical form, a surety of medical attention and observation.

It is under just such a plan that practically every efficient hospital in this country is run; and had the framers of the original Hospital Bill been guided a bit more strongly by axiom, and been led a bit less willingly by the spirit of experiment, it is just such a plan that would have been drafted two years ago. To those who are in touch with hospital management, it is incredible that the proposal of the plan outlined above should occasion in the Hospital Board either indecision or friction. It is with regret that one notes evidence that both these factors are playing a part in delaying the development of our hospital situation.

THE IMPORTANCE OF EARLY DIAGNOSIS IN CANCER OF THE MOUTH.

If any good can result from an educational campaign in reference to the importance of the recognition of the early manifestations of cancer, and of those conditions that are known to predispose cancer, it would seem that the most striking results should be obtained when the disease originates in the buccal cavity. Though possibly 75 per cent. of all cases of cancer of the mouth are preceded, often for years, by recognizable chronic lesions that are known to predispose this disease, still here as elsewhere, its occurrence is on the increase and comparatively few cases involving the mouth come to operation during the very early period of the disease. This, in spite of the fact that in no other region is an acquired abnormality so quickly recognized and in spite of the fact that cancer develops at an age when the teeth are be-

ginning to disintegrate, or artificial teeth are worn. In this country there are few people of the present age who do not consult a dentist repeatedly.

During twenty-five years Butlin operated upon some two hundred cases of cancer of the tongue, and he was recognized as the foremost man in connection with the study and treatment of this disease. White-head operated upon about the same number, while it is probable that no other surgeon has been called upon to treat as many cases.

From figures furnished from the General Registry office of England, Butlin learned that there was an average of seven hundred and fifty deaths from cancer of the tongue in England each year. He estimates there are possibly seventy successful operations done during the same period. This would give an average of cures—three-year-period—of 8.53 per cent.; whereas the average of cures by early operation should be well above 50 per cent., and the proper treatment of lesions known to predispose the disease ought to greatly reduce the frequency of its occurrence.*

In this country even less accurate data are obtainable; but, judging from the records of certain large hospitals, the condition here is even less favorable. Of one hundred and seventy-two cases of cancer of the mouth that entered the Massachusetts General Hospital during a period of fifteen years, 1892 to 1906, fifty or 29 per cent. were plainly inoperable at the time of admission.

Besides greatly increasing the probability of cure, the early recognition of cancer has the equally important result of rendering the treatment much less hazardous. The operative death-rate from radical operation of fairly early cases is something between 3 and 5 per cent., while for the more advanced cases in which the disease may still be considered as possibly curable, the operative death-rate is something between 20 and 30 per cent. Considering, on the one hand, its invariable outcome—unless successfully operated upon—the sufferings of the patient and the improbability of successful treatment in the advanced stages; on the other hand, the success or long periods of immunity that may follow comparatively simple early operations, the importance of very early diagnosis cannot be overestimated. The earliest characteristics of cancer, together with the conditions that so frequently antedate its clinical development, should be the subjects of study, not only by surgeons but by all practitioners who have occasion to examine the mouth. Until the much-desired cancer specific is discovered, it is mainly those medical practitioners and dentists, who make complete, thorough, quick survey of the whole mouth of every patient and appreciate the importance of chronic lesions, to whom the surgeon and the general public must look, for any reduction in the present increasing death-rate from cancer of the mouth.

*Special Surgery of the Mouth and Jaws. By Vilray Papin Blair, M. D. St. Louis: C .V. Mosby Company. 1912.

OPINION AND CRITICISM.

THE SOCIAL EVIL AGAIN.

While the second edition of "The Social Evil With Special Reference to Conditions Existing in the City of New York" (G. P. Putnam's Sons, New York) is a commendable production in more ways than one—its editor, Prof. Edwin R. A. Seligman bespeaks this—it nevertheless is far from being the intimate, human, and candid exposition of the subject that we find in "The Social Evil in Chicago." Of course, this is not meant to convey the idea that the book is not worth while, or that no pains were taken in its compilation to bring before the public the "situation" in New York; but despite these assets it somehow fails to achieve that clarity which must be the integral part of all books if they are to "message" not only truths but the solution of problems. Perhaps the scholarly attitude of the editor, his knowledge of the history of prostitution, his delicacy in exposing wrongs that require a certain coarseness if not brutality, and especially his wide readings in the literature, are obstacles in a work of this nature; but whatever it may be, the book under consideration lacks the Zolaesque flavor of its Chicago congener and is hence less effective. And here it would be well to call the attention of all writers on prostitution to one point—namely, that while a degree of reticence may be an asset in other books, in any work on prostitution an abandon should be practised such as may call forth criticism from the gentle-nurtured but cannot be offensive to the man who knows. Now, what sort of man could best write on this subject? Without prejudice, it may be stated here that undoubtedly the physician of education and broad attainments, who does not allow himself to be hampered by what his church-going clientele may think of him, who is outspoken to a degree that is not affected by those who dwell in Philistia, is just the person fitted for the work, for his is the knowledge that can mow down all those stubbles round which the social philosophers are taking their mincing steps lest a trampling down will be construed as too vulgar an act. The physician, we have in mind, would not hearken to the twaddle that prostitution can be abolished by stringent laws, that venereal diseases are a providential reprimand, that education along sexual lines will make purer men, even if women will benefit to some extent, that long and tiresome disquisitions on wage-earning will ever make the economic conditions so much better that men and women at large will no longer think of grosser things but bask untempted in an atmosphere not of this earth. But he would hearken to what he knows

beyond a doubt—that regulation of prostitution if prosecuted to its utmost limit, not by the police, or by churchmen whose lines of thinking are too parallel, but by a body of medical men, would not be without outstanding results, that the spread of venereal diseases can be combated by unrelenting physical examinations, that the male offender requires the same quarantine as the female, and finally that venereal diseases, while not desired by any one person, can be cured, temporarily in the case of syphilis, when the intelligence of the physician is seconded by that of the patient. Of course, all these measures would not stop prostitution, but have we stopped wars, have we stopped murder, have we ameliorated poverty? At least this much can be said if a body of intelligent physicians were placed in power, that though the standard of morals may not be raised, yet the dreadful consequences of neglect to attend to venereal diseases at the right time would lessen much of the evil that is with us to-day.

EATING AND "FEEDING."

No doubt, there are a number of people in this world who know how to "feed," but how many know how to dine? Indeed, it would be difficult to answer this question, since the majority of us do not draw the fine—or is it the coarse?—distinction between the two. And when it is a question of the amenities that should go with civilized masticatory performances, how many of us even know when or how to apply the word? Now, in "Dining and the Amenities" by a Lover of Good Cheer (Rebman Company, New York), the reader will find a very good definition of the amenities pertaining to dining and also other valuable matter that will attract his attention perhaps long enough to make him aware that somehow he has failed to derive all the pleasures that inhere in eating as distinguished from "feeding." Just why in our own country there has been a horror of being put down by one's friends as one who likes the good things of the table—likes them as a cultured man should—is one of those unsolved problems that baffle the ordinary intelligence. But let us hope that we are improving a bit; that before long such books as the one under consideration will be instrumental in bringing the attention of many Americans to the subject of the equal importance of dining intelligently with "How I Made My Millions," "Why I Am a Prominent Citizen," "How to Live Comfortably on One Dollar a Week" and other allied subjects which appear to have enslaved our minds to-day. Surely the American stomach has been shabbily treated in the past, has been the receptacle for foods that have been put together by the rawest mechanics, has been dosed, in case of rebellion, with medicines the trail of which would possibly

encircle many of our states, been mauled and battered, medically speaking, as no other stomach since the dawn of civilization. But, as we said before, the times are ripe for books to enlighten us as to our past and present sins; and if we would but remember what Brillat-Savarin said in the first quarter of the nineteenth century and which runs thus: *"Les animaux se repaissent; l'homme mange; l'homme d'esprit seul sait manger,"* a text of inexhaustible value would never be lacking to point a moral to the apparently never-ending tale of our national indigestion.

LITERARY NOTES.

The "Gesammelte Werke von Robert Koch" (Georg Thieme, Leipzig) which have recently been published in three volumes, or to be more exact the second volume has two parts, is a publication whose completeness and exactness, not to mention its scientific flavor, are of so high a degree that no special student in the line of bacteriology and microbiology should forego owning them. No doubt, the general practitioner has read certain papers by Koch in which his interest at the time of publication was more than passing, recalls the controversy which resulted some ten years ago when Koch announced at the Congress of London that bovine and human tuberculosis were so dissimilar as not to be intercommunicable, has discussed with his confrères the ups and downs of tuberculin as a curative measure and his non-belief in its impeccability; but granting all this, has he any conception of what this man really stood for in the scientific world—his labors, his successes, and, despite his apparent defeats, his fulfilment of a career that was equalled only by that of Pasteur? What we have just written reminds us of the fact that our knowledge of our great men is decidedly limited; and that only on rare occasions when the prescience of editors is on a par with what it must have been in the case of Professors Gaffky, Pfuhl, and Schwalbe, the present editors, are we the beneficiaries of an amount of knowledge that is a liberal education in the matter of herculean endeavors to vanquish disease and advance medical science, not by jots, but by bounds that should be marked in our calendar of great deeds with letters of flaming red. Now, whether the reader of these sumptuous volumes—not sumptuous as regards binding but as regards scientific data—be a bacteriologist or just a plain (?) general practitioner, his benefit will be alike in one point—namely, the thought will be brought home to him that what he should know of Koch is contained in these volumes, and that any neglect on his part of their salient features will be indicative of a frivolous, carping, and cavilling mind.

Those physicians who have enjoyed reading "Literary Lapses" and "Nonsense Novels" by Stephen Leacock—and be it said here even the most serious-minded physician could not better employ his leisure moments than to relax under the spell of Leacock's humor—will hail with delight "Sunshine Sketches of a Little Town" (John Lane Company, New York) which has just come to our desk. The author is no less a person than Professor of Economics and Political Science at McGill University, Montreal; and though one would think this were distinction enough, such is not the case, for his greater distinction lies along altogether different lines, lines of an originality in the way of humorous writing that stand unequalled to-day. In the Preface to this book one may read quite a bit about the author, as written by himself; and the whimsical manner in which he puts things and the extreme candor as to his modest claim to success in the scientific and literary world are points which should be milestones to all authors who are tempted only too often to set forth their great qualities of head and heart for the edification of the reader. To quote: "I was soon appointed to a Fellowship in political economy, and by means of this and some temporary employment by McGill University, I survived until I took the degree of Doctor of Philosophy in 1903. The meaning of this degree is that the recipient of instruction is examined for the last time in his life, and is pronounced completely full. After this, no new ideas can be imparted to him. * * * The writing of solid, instructive stuff fortified by facts and figures is easy enough. There is no trouble in writing a scientific treatise on the folk-lore of Central China, or a statistical enquiry into the declining population of Prince Edward Island. But to write something out of one's own mind, worth reading for its own sake, is an arduous contrivance only to be achieved in fortunate moments, few and far between. Personally, I would sooner have written 'Alice in Wonderland' than the whole Encyclopædia Britannica." But though these lines are delicious, the body of the book is far more engaging. Here we meet the "prominent" citizens of a typical country town, typical in that its characters would be life-like no matter what its geographical situation. Whether Leacock uses his unusual art in describing Mr. Smith, proprietor of Smith's Hotel, Judge Pepperleigh, the fiery Conservative, to whom the mere mention of a Liberal is sufficient to cause a mental flurry that is only assuaged by a deluge of denunciations, the Rev. Mr. Drone, whose sermons "were not only stimulating in matters of faith, but contained valuable material in regard to the Greek language, to modern machinery and to a variety of things that should have proved of the highest advantage to the congregation," or Mallory Tompkins, the real intellect of Mariposa, who had an incurable weakness for subscribing to works in fifty volumes "at fifty cents a week for fifty years" and continually having them taken away on account of non-payment, the interest of the reader is held, not so much by the humor

as by the humanness of the characterizations. But the humor, just because it is not of the exaggerated order so popular in America to-day —its whimsicality, its slyness, its refinement are undeniable—is a natural part of the narrative, closely interwoven so as to bring out the high and low lights of the various characters, and makes appeal at once to anyone who has the literary sense, and is a bit tired of the blatancy and vulgarity of our own humorous writers.

———

What cinematography may do to aid science has latterly been made the subject of much interesting research, and if any doubt still remains in the minds of certain hardened and obtuse physicians as to what this "plaything" will effect in the future, we would commend to them two striking contributions of recent date: one by Dr. Rudolph Matas entitled "The Cinematograph as an Aid to Medical Education and Research" in the *New York Medical Journal* of August 31st and September 7th, the other, "The Cinematograph and Natural Science" by Leonard Donaldson (Ganes, London). In the latter the reader will find much that will hold his interest; for even though the idea may have occurred to him, after repeated visits to motion pictures, that there is a possibility of applying this sort of entertainment to higher needs, such as medical education and science, its great importance as an adjunct, we surmise, is but rarely given the serious thought which it deserves. In the chapters of this book then the reader will see, that what was thought by him as a mere possibility has really passed beyond that stage, and is so far advanced in the practical field that even to-day all scientific lectures should lean rather heavily on the undoubted aid that motion pictures can yield. Mr. Donaldson, not being of the medical profession, is guilty every now and then of allowing his enthusiasm too great a sway, especially in those instances where he is in favor of instructing the people at large as to the various steps of a surgical operation—his idea is that enlightenment will rob the surgical undertaking, in the minds of the onlookers, of all or nearly all its terrors—or the great benefits to be reaped in the matter of hygiene by instructing the ignorant as to its fulfilment; but, though we as physicians may raise objections to these procedures on grounds that are too medical for the layman to grasp with intelligence, no objections can possibly be raised to similar exhibitions for the medical student or the earnest advocate of hygiene. But aside from this criticism nothing but praise should be given this little work that bears on every page the serious thought of the writer, and is of vast interest, since to the rank and file in the profession a motion picture is simply a form of cheap entertainment not worth while remembering for long.

ORIGINAL ARTICLES.

CRITICAL REVIEW OF THE THEORY OF MUSCLE RIGIDITY AND DEGENERATION IN PULMONARY TUBERCULOSIS AND OTHER CONDITIONS OF THE THORAX. NERVOUS MECHANISM AND DIAGNOSTIC LIMITATIONS.

By J. L. Pomeroy, M. D., of Monrovia, Cal.

Rigidity or spasm of the muscles of the thorax has been brought forward by the clinical researches of Dr. F. M. Pottenger, as a sign of value in the early diagnosis of intrathoracic lesions, particularly in pulmonary tuberculosis. Degeneration or a condition of flabbiness or decreased tension has been described by the same author as a late condition in the same process. Since his discovery in March, 1909, Dr. Pottenger has fully investigated this phenomenon with growing enthusiasm and belief in its utility as a diagnostic measure in clinical examination of the chest. Any new or untried measure of importance to our clinical armamentarium, particularly in the diagnosis of pulmonary tuberculosis, deserves careful investigation. The writer, having been associated with Dr. Pottenger during the period of the evolution of this sign, feels sufficiently familiar to assume a critical attitude.

In numerous contributions the details of this sign or symptom have been set forth, and while it is perhaps too early definitely to state what place this phenomenon will win for itself, many clinicians have been more or less favorably impressed with its use.

Description of Pottenger's Muscle-Spasm or Rigidity and Muscle Degeneration (Regional).

In early apical tuberculosis, by gently palpating the muscles overlying the suspected part, one will appreciate an increased sense of resistance which limits itself to the area over the inflamed lung. The neck muscles on the side involved are more rigid, also stand out more prominently than on the less acutely inflamed side or the uninvolved side. The trapezius, sternocleidomastoid and pectoral muscles as well as the muscles over the posterior upper third of the chest show the change most plainly. It may, however, be felt in the intercostal muscles by pressing the finger-tips somewhat more deeply into the intercostal spaces. The flabby

or stringy (degenerated muscle) condition follows the same limits, only it is seen in the chronic inactive condition of the lung tissue.

In tuberculosis of the kidney, one can appreciate these signs over the muscles in the lumbar region. In abdominal tuberculosis the same sign is to be readily demonstrated. This, in brief, is the description of the muscle-sign as brought out by Pottenger.

Unquestionably increased tension of the muscles in intrathoracic diseases has been observed and described more or less extensively. Musser, as well as West, observed increased tension in the intercostals. In the historical review of the sensory, vasomotor and secretory symptoms, it will be seen that many writers have touched upon this question. However, to Pottenger belongs the credit of independently bringing forth this phenomenon as a diagnostic sign and giving the subject tangibility.

HISTORICAL REVIEW OF SENSORY, MOTOR, AND VASOMOTOR PHENOMENA.

Changes in sensation in the skin of the chest-wall have been reported in numerous observations. Jessen gives an excellent résumé of the literature up to 1904. Many of the following remarks have been taken from his monograph. Until the time of the appearance of Head's work, little study was given to this question. Nor could the findings be adequately interpreted. Wuertzen states that Valsava after Morgagni (1666-1723) mentioned in pneumonia *"dolor qui tangendo augebatur infra ipsas costas nothas a dextris infraque ensiformem cartilaginem."* The earlier authors thought that pain in intrapulmonary lesions was always due to pleurisy. Head's researches in referred pain, as well as Dana's work, show this not to be so.

Since the mechanism of the muscle-changes must bear a relation to the observations made upon the sensory, vasomotor and similar phenomena, it is necessary to consider them in detail.

Louis, in 1843, considered intercostal neuralgia to be quite common in phthisis, and regarded it as a peripheral neuritis. Guensburg noted toward advanced stages, hyperesthesias of the muscles, severe pain in the neck and back, in the breast and legs. Beau described an *arthralgie* or *mélalgie* of the lower extremities in which there was severe pain similar to lead neuritis. Walsh, in 1860, described a similar condition and believed it did not follow the nerve lines and was not a true neuralgia. Leudet, in 1864, described other cases of peripheral nerve disturbances.

Pitres, Vaillard and Hammer (1886) did much to clear up this field. They noted that clinical symptoms in the presence of neuritis often failed to appear. They described several different forms of neuritis: first, a latent neuritis with no clinical symptoms, but demonstrated at autopsy; second, neuritis causing atrophy and paralysis in the muscles; third, neuritis with sensory symptoms only. Hammer claimed that the intensity of the symptoms depended upon the duration of the disease, many patients dying of the pulmonary condition before the development

of the peripheral nerve symptoms. He found degenerative changes regularly followed experimental injection of tubercle poison into the spinal cord. Degenerative changes in the periphery followed also. Giese and Pagenstecher described a case of tuberculous neuritis, in which there was paraplegia. At autopsy there was vacuolation of the anterior horn cells. "Therefore in phthisis one can certainly say that marked peripheral neuritis may occur, also that one may find degeneration of the anterior horn cells." Furthermore, Ferraris was of the opinion that the specific poison of the tubercle may attack the axis cylinder of the peripheral nerve.

The neuritis does not seem to be the result of faulty metabolism associated with the cachectic state, as it frequently arises during the healing state. Unquestionably cachexia brings about a condition favorable to its development, but neuritis frequently occurs without cachexia. It is a question, however, whether the symptoms are not to be explained in many instances on the basis of a functional condition. Also in many instances the etiology is not clear—syphilis, alcoholism, hysteria and other conditions may bear close relation to the appearance of neuritic symptoms. Slight disturbances, however, it must be admitted, occur far more frequently than we realize, and in many cases no pathological changes are to be demonstrated. Here the question arises, "To what extent are the evident clinical, and the minute anatomical changes in the muscles of a tuberculous patient as shown by Frænkel, the result of direct tubercular poisoning of the substance of the muscle or a disturbance in the nutrition of the nerves?"* A direct effect upon the nerves, particularly in the mediastinum, by enlarged bronchial glands and pleuritic thickenings, is also to be considered. In a third sense one must consider the reflex pathway through the sympathetic, vasomotor, secretory and trophic nerves.

NEUROLOGICAL OBSERVATIONS.

In many cases with meningeal symptoms no anatomical changes have been found. These cases must be explained upon the basis of toxemia of the brain and nerve cells, as in uremia.

Steinert found degenerative changes in the nerves spreading to the periphery. He describes marked changes in staining quality in the nerve fibres, changes in the sheath of Schwann, atrophy of the endoneurium, periaxial degeneration, and atrophy of the muscles. De Renzi describes changes in the phrenic nerves and intercostals in 27 out of 29 cases of phthisis. Jappa observed changes in the peripheral nerves with only neuralgic symptoms during life. Oppenheim and Siemerling also observed "latent neuritis," and Steinert found changes in the saphenous nerve with no clinical symptoms. Cestan describes

---

*Jessen: Lungenschwindsucht und Nervensystem, p. 58. Jena: Gustav Fischer. 1905.

changes in the lumbar ganglion cells, chromatolysis, etc. Jessen states: "One should always remember the causative tubercular factor in primary neuritis in cases in which occasionally secondary changes in the ganglion cells of the cord occur and even degeneration of the whole tract of the spinal cord. And at the same time one should emphasize that the tubercular toxin can cause primary changes in the cells of the cord, which may lead to secondary disturbances of the peripheral nerves and, perhaps, of the muscles, and, under certain circumstances, explain the clinically evident nervous manifestations."*

Mueller found peroneus paralysis in a tuberculous patient, with cavity formation in both lungs, who was also an alcoholic. The cord was normal, but there were degenerative changes in the peroneus nerve and atrophic changes in the muscle. Frænkel is of the opinion that these changes in the muscles were not characteristic of tuberculosis, that they were observed many times in association with cancer cachexia. Jessen believes, however, that *a priori* neuritis and muscle atrophy must be due to the tuberculous process in the cases cited. Jamin after much study came to the conclusion that the simple atrophy of paralyzed muscles only followed inactivity, while degenerative forms with changes in the fibres only came about through a toxic or traumatic cause.

The presence of a neurological basis for the symptoms under discussion seems to be amply worked out by Struempell, Jessen, Eisenlohr, Vierordt, Pitres and Vaillard, and others. Starr is conservative, and states that it is difficult to designate these neuritic phenomena as "tuberculous neuritis." Cramer (1893), however, describes a parenchymatous degeneration of the nerves similar to that found in infectious neuritis.**

In regard to an atrophic condition of the trapezius observed over an apical tuberculosis, Jessen states: "Here the question arises to what extent the peculiar muscle atrophy of the trapezius, which is evident in one-sided or double-sided apex disease, is the result of an intoxication of the muscle or attributable to a neuritic basis. The occurrence of the so-called thorax paralyticus is also involved in this question. That these are not the predisposing grounds for the tubercular disease, but a symptom of the same often seen in early childhood following the tuberculous infection, seems clear. This view was advanced first by Cohnheim. Upon this question there does not exist any anatomical data. The following observations bear, however, a relation. Were this muscle atrophy the result of general intoxication, it would not be clear why other muscles in this early stage do not show similar symptoms. We have seen, however, that the atrophy of the trapezius is evident only over the affected apex; one can see a depression over the area affected, and this not only in thin people. There must, therefore, be a local rela-

*Lungenschwindsucht und Nervensystem, p. 60. Jena: Gustav Fischer. 1905.
**Schmidt: Zur klinischen Pathologie des peripheren Nervensystems bei Lungentuberkulose. (*Wien. klin. Wochenschr.*, p. 722, 1899.)

tion between muscle atrophy and lung tuberculosis. If there is a diffusion of the poison only in affected territory, the local relation must be hypothetical. We know only that a 'latent neuritis' is possible. Head and Egger have demonstrated a connection between the thorax nerves and the lung tuberculosis, with areas on the skin."*

Jessen further states: "Therefore it is not impossible that, in the same way as the nutrition and tonus of the nerves regulating the muscles are affected, the circumscribed muscular atrophy may occur on account of damage to the nerves, whether through a 'latent neuritis' or a purely functional disturbance. A definite solution of this question will be achieved only when anatomical researches in the nerves and muscles are undertaken. Nevertheless, it is striking that in cases in which only parts of the trapezius appear atrophic, in these parts, in contrast to the non-atrophic parts, there is a decided diminution of electrical reaction up to a complete subversion of the laws of contractility."**

In this statement Jessen clearly states the problem before us. As his work was published in 1905, if there is any credit to be given to the observance of muscle atrophy in pulmonary tuberculosis, certainly there are good grounds for him to claim priority.

The melalgia of Beau (1856) is a condition of severe pain in both thighs and knees; there is no atrophy, no paralysis, and it is not dependent upon fever. This condition in some instances seems to be similar to meralgia paresthetica as described by Bernhardt and Roth in 1895. The writer has twice observed a meralgia paresthetica of the external cutaneous femoral nerve; once in a young woman with slight involvement of the right apex, and again in a man of forty-two years with third stage lung condition. The symptoms were similar to the case recently described by Miller, of Chicago.† Bernhardt considered a toxic neuritis as the most important factor. Jessen also describes similar cases often beginning with hemoptysis. Leudet has described cases with severe pain over the vertebræ, which ran girdle-like about the intercostal nerves. He also has seen such pains in the head, neck and extremities. The writer has seen similar pains limited to the calves of the legs, for which there was no other cause to be found than the tubercular infection. Petruschky describes a vertebral pain even in early cases over the spine from the second to the seventh dorsal vertebræ. This, however, is a referred pain, seen also in aneurysm and cardiac disease. It occurs long before evident pulmonary symptoms. Jessen suggests irritation of the heart by the tubercle poison as a possible factor in its causation.

Rendu observed toward the end-process of phthisis, analgesia and cold sensations with formication on the anterior aspect of the forearms. Pitres and Vaillard described a typical neuritis with hyperesthesia, pain, and diffuse hyperalgesia with anatomical change in the nerves.

*Lungenschwindsucht und Nervensystem, p. 62. Jena: Gustav Fischer. 1905.
**Ibid., p. 63.
†Archives of Internal Medicine, Vol. VII, No. 2, p. 182.

In many early cases of apical tuberculosis there is a "rheumatic" pain, which occurs round the shoulders, and the second dorsal vertebra. In these cases Jessen found no atrophy or hyperesthesia. In 1600 men and 800 women Mahler found changes in sensation nine times.

In 1899, Schmidt, in an exhaustive article, described various changes in sensation over the chest-wall and other parts of the body in pulmonary tuberculosis. Particularly, he found pain on pressure over the suspected apex (*unilateralen plexus Druckschmerz*) as a typical finding. He also describes changes in sensation and motor symptoms in the distribution of the ulnar nerve, a feeling of deadness in the fingers, hyperhydrosis of hands, acroparesthesia, neuralgic pain in the shoulders, and intercostal neuralgias. He also observed cases of peripheral neuralgia. He found the *plexus Druckschmerz* frequently to precede hemoptysis. He considered the condition to result mainly, in a mechanical way, by changes in the anatomical relations, at the apex of the lung, with the brachial plexus, the vagus, the phrenic and other nerves involved in adhesions with the pleura. He considered also a toxic effect upon the nerves to be quite possible. Whilst he described various reflex, vasomotor and trophic phenomena, he paid little attention to the muscle changes about the thorax.

Bozzolo has described, under the heading of tuberculous rheumatism, diffuse pains in the tendons, joints and bursæ. Laserre described a similar condition and thought it due to a reflex between the lung condition and the nerve center, and suggested anemia as its cause. Again it may be the first sign of actual tubercle in the joint. Recently muscle degeneration about the involved joint has been discussed. Niehans thought that it was due more to a toxic effect upon the muscle.* Weill described hemihyperesthesia of the joints and bones, and thought it due to some nerve disturbance from the lungs and bronchi.

Herpes and Exanthemata.

Zoster and other exanthemata frequently occur in pulmonary tuberculosis. It is a significant fact that many of Head's patients, upon whom he did his research work, were tuberculous. Leudet, in 1878, described a case of herpes zoster in tuberculosis of the lungs. Rendu adds others. Jessen describes a case of a psoriatic rash over the course of the peroneus nerve, associated with neuralgia of the same.

The following marked case of herpes recently came under observation. In a man, aged forty-five, with much activity in the upper part of the left lower lobe of the lung, after several days of severe pain about the region of the seventh and eighth dorsal segments, a decidedly marked herpes appeared in the same area. It accompanied marked congestion in the lower lobe. The writer has observed herpes along the course of the anterior tibial nerve once, along the course of the ulnar nerve twice,

*See Pottenger's paper, *Brauer's Beitræge,* Bd. XXII, Hft. 1.

and about the chest four times during the past two years. In a very toxic case, he observed a marked erythema nodosum, which seemed to follow the course of the ulnar nerve into the hands, and the corresponding area along the legs into the soles of the feet. The papules were exquisitely painful and came in crops. There was no tonsillar or other infection to account for it. The writer has twice seen herpes about the area of the anus and posteriorly over the sacral area. Of course, these symptoms may occur in association with meningeal complications, but none of these cases had such complications.

Visceromotor and Viscerosensory Reflex Anomalies.

Faber first observed hyperesthesia of the skin in stomach disturbances. Lange, in Copenhagen in 1875, also made some observations upon the visceral reflexes. Head first gave us the general schema. In 1838 Stokes made the observation that in pulmonary tuberculosis the pain appears in the side of the chest, in the neck or shoulder, and usually combined with a tenderness in the infraclavicular region. In 1856, Gunsberg described the dull-pressing pains in pneumonia, and stated that they may be referred to the shoulder, the opposite side of the chest, under the liver or extend up into the neck or arm. He also observed a hyperesthesia of the skin over the upper lobes of the lung and in the neck of the diseased side, which persisted for nearly four weeks after resolution. He thought that this referred pain came in some way through the medulla. Lange ascribed the referred pain of subphrenic or diaphragmatic pleurisy to the hypogastrium. Ruehle maintained that pain from lung disease was always due to pleurisy; nevertheless, he admitted that in exceptional cases of tuberculosis of the lower lobes painful sensations may arise with no demonstrated pleurisy. Rosenbach stated that the pleurisy pain may radiate to the shoulders, the arms and epigastrium, the latter due to diaphragmatic pleurisy. Often he found intercostal neuralgia with points of tenderness and marked cutaneous hyperesthesia. Ziemssen and Filatow regarded abdominal pain in children as a valuable diagnostic sign where pleurisy or pneumonia was suspected. Cornet found the pain in tuberculosis of the lungs, with but few exceptions, to localize itself over the affected side, and states that it can be felt partly as a hyperalgesia that is elicited by percussion or even by light touch palpation, particularly over the sternum and the third and fourth thoracic vertebræ. Turban adds pain to the first symptoms of tuberculosis. Walsh noted sensitiveness to pressure over the diseased area, accompanied by a superficial hyperesthesia.

Francke, in 1908, described a hyperalgesia on deep pressure with the finger-tips, which limited itself to the diseased side. Wuertzen, in 1906, gives an exhaustive review of a study of reflex hyperalgesia in lung tuberculosis. He established the fact that it was present in nearly half his cases, bore a distinct relation to Head's zones, and was more liable to

be present in early life than in later years. That there was no marked difference between men, women and children was not due to hysteria, but was found as often in the non-neurotic as the neurotic. The hyperalgesia did not bear any relation to the underlying pleurisy. "As is known, Head asserts that diseases of the serous membranes cause no reflex hyperalgesia; and this assertion is the more remarkable because the serous membranes are without exception or, at all events, in nearly every instance innervated by the sympathetic."*

Head finds the reflex areas most often in connection with the third and fourth cervical zones, and from the third to ninth dorsal zones: the skin over the neck, shoulder and breast; also hyperesthesia in the area supplied by the fifth nerve. When the reflex appears early and one finds signs through the supraclavicular area, then the hyperesthesia lies in the area of the third and fourth cervical and third dorsal zones.

If the signs are lower down, then we get hyperthesia over the area supplied by the third, fourth, and fifth dorsal zones.

If signs appear in the axilla and under the shoulder-blade, then one finds the areas supplied by the fifth, sixth, and seventh dorsal segments. Not infrequently one finds also hyperesthetic zones in connection with the lower dorsal and first lumbar, in the region of the gastric reflex pathway.

Between the fifth and eighth cervical is a zone without any reflex hyperalgesia as no fibres from inner organs bear any relation thereto. These zones are not felt subjectively, but must be demonstrated by picking up a fold of the skin or pricking with the dull end of a needle. Egger found them in 11.9 per cent. of men and 20 per cent. of women. The rapidly advancing conditions because of rapid destruction of the nerve-endings in the lung gave the least reflected hyperalgesia. In dry pleurisy and frank pneumonia the zones are seldom to be demonstrated. In nervous individuals the zones may remain for a year or more after the lesions have healed. Fever does not influence them. (Head described a "generalization" or spreading of the zones in acute grippe or similar infections.) Jessen and Egger think that hysteria may play a large rôle in their production. Other observers deny this, as they are to be found absent as many times in neurotics as in non-neurotics. Disturbances of the stomach and bowels frequently confuse the picture. Occasionally we find disturbances in the sensibility of the skin over the area supplied by the fifth to eighth cervical with hyperesthesia in the arm. Very seldom are they reflected over the healthy side, although Head has observed this. In this connection it must be remembered that Head's zones refer to spinal segments, and are to be interpreted on the basis of pain, heat and cold sensations, and trophic functions; they do not overlap. Sherrington has demonstrated by the sensation of touch that the areas represent the distribution in the skin

*Zeitschr. fuer Tubercul., Bd. VIII, Hft. 4, p. 297.

of the posterior spinal roots and that they overlap, while Head's areas represent those supplied and represented in the cord by the segments, and so do not overlap.

More recently White and Van Norman have brought out the existence of a reflex hyperalgesia over the inflamed lung, which limited itself accurately to the extent of the involved area, is not due to pleurisy, and follows Head's segmental laws. This will be discussed in the clinical section.

MOTOR SYMPTOMS.

It is abundantly proved by clinical and pathological data that we can have on a tubercular basis, severe neuritis with disturbances of the sensibility of the skin; furthermore, paresthesia, acroparesthesia, formication and other disturbances occur. Reflex hyperalgesia following Head's teachings have been frequently observed; and now it is to be seen what changes are to be found in the musculature or the purely motor nerve. Paralysis of the vagus recurrens is not uncommon. Wirtz saw a case of paralysis of the dorso-flexion of the foot with reaction of degeneration (paralysis of the peroneus). Various forms of paraplegia, hemiplegia, apoplectic type, isolated nerve involvements, and localized paralysis have been described. In many cases the etiology is mixed, alcohol, syphilis and other factors besides tuberculosis playing a rôle. In these cases the authorities speak of a "summation" of causes.

The paraplegic forms resemble Landry's paralysis, and death seems to be due to phrenic nerve involvement. Jessen describes cases and quotes Pal. There was severe pain in the legs followed by paralysis, reaction of degeneration, atrophic changes in the muscles, absent reflexes. Francis describes a case coming on like apoplexy, a neuritic apoplexy similar to Eichorst's "alcoholic neuritis." Vierordt describes degeneration of the phrenic nerve. If the patient lives long enough, death takes place from paralysis of the diaphragm. Joffroy describes a paraplegia of the upper extremities. Korsakoff's syndrome—polyneuritis with psychic disturbance—may be secondary to pulmonary tuberculosis. Rosenheim describes a case of paralysis of the extremities followed by symptoms of vagus disturbance and death. In this case hemorrhagic inflammation of the peripheral nerves and the vagus was found. Senator describes paralysis of the lower extremities with severe pain. There was reaction of degeneration with absent reflexes. In a case described by Steinert with an apical lesion and pleural exudate, there were stabbing pain, hyperesthesia followed by changed reflexes, atrophy of the muscles supplied by the ulnar, the crural, and peroneus nerves. Alcohol seemed to be a possible factor in this case. With improvement in lung condition the nervous symptoms gradually disappeared. Senator further describes a case of tubercular neuritis with paraplegia, in which he demonstrated an acute interstitial myositis in the gastrocnemius. There was

interstitial proliferation of the nuclei and atrophy of the muscle fibres. Pottenger has demonstrated the presence of degenerative changes in the muscles over the diseased areas of the lung.

Jessen states, "that the muscles, the final termination of the peripheral neurons, alone, or in connection with the intramuscular nerve-endings may be damaged secondarily to a nerve-trunk affection due to tubercular toxin. And here reference should again be made to the neuritic changes, the 'latent neuritis' observed anatomically by Pitres and Vaillard, Steinert and others, and the muscle atrophy in the minute intramuscular branches observed by Vierordt and others, as, for instance, in the gastrocnemius."* Jessen tested the muscle reaction in many cases of terminal phthisis with the electric current, and while the form of the reaction showed an atrophic condition, there was no reaction of degeneration. In this connection the recent observations of Balint are interesting. By testing the muscles over the diseased area of the lung with the electric current, Balint obtained muscular contractions with a weaker current than over the normal lung tissue. The greatest irritability to the current was over the side most intensely affected. He also noted the presence of increased muscle rigidity over these areas. The irritability decreased as the patients improved. "The highest grade of irritability is to be found in those muscles which receive their motor fibres from the same portion of the cord that supplies nerves to the apices of the lungs. The participation of the other muscles depends upon the manner in which the irritability happens to be radiated."

In Jessen's cases nutrition seemed an important factor, and the shrinking of the muscles resulted from cachexia. Stokes, in 1838, called attention to the myoidema or nodular contraction of a muscle bundle on percussion as a sign of pulmonary tuberculosis. Tait and Walsham found in 1000 cases that it resulted in many diseased conditions, and did not find it to be an early sign of tuberculosis, but only a sign of muscle atrophy. In extreme cachexia it disappeared. The electrical reaction was normal. Broadbent thought it occurred only in the diseased side and laid considerable stress upon it for diagnosis. Bozzolo also thought that a mechanical irritability of the sternocleidomastoid was an early sign of pulmonary tuberculosis. Jessen observed the same things. He reports a case of idiomuscular contraction of the left orbicularis in a left-sided lung infection. He also observed, several times, weakness of the masseter muscle. Further, he frequently observed atrophy of the trapezius muscle over an affected apex, with changed reaction to the electric current.** Remak describes a case of rigidity both of arm and shoulder muscles, without disease of the joint, in a tubercular case in advanced stages. The electrical reaction was normal. Tendon reflexes increased, no paralysis. Remak concluded that it was a reflex increase disturbance

*Lungenschwindsucht und Nervensystem, p. 75.   Jena: Gustav Fischer.   1905.
**Ibid., p. 77.

of muscle tonus, but thought it possibly a latent neuritis. There was no tetany.

Weakness of the voice is a frequent symptom of pulmonary tuberculosis, and is unquestionably a reflex phenomenon through the recurrent branch of the vagus. Schaeffer observed a paresis of the cords in 50 per cent. of his cases, mainly on the side of the involvement. The nerve may be involved in adhesions along its course, or may be directly affected. Mandel gives the following figures: In 52 cases of right-sided lesions, 50 were hoarse; in 32 of left-sided lesions, only one. Many cases of paralysis of the nerve have been observed. Brieger found the vagus normal in one case, but the bronchial glands markedly swollen. In some cases (Gerhardt) the lesion was central (hemorrhage in pons).

Weakness of the eye-muscles occurs not infrequently. The writer has observed this symptom frequently, particularly in those who read a great deal. Frænkel has described many such cases.

Sympathetic, Vasomotor, Secretory and Trophic Disturbances.

Pupillary changes are frequently observed. Usually the pupil is larger on the side affected. This may come through the sympathetic to the two lower cervical and two upper dorsal, either through bronchial gland enlargement, pleural adhesions, or irritation through the vagus and the brain centres. Jessen does not think it of much value. Turban observed a case where pupil dilatation preceded the cough by one year.

Flushing of the face, and rapid changes in heat and cold sensations are frequently noted. The vasodilator power of the tubercle poison seems specific. The irritation may be upon the higher centres, or through the sympathetic ganglion (superior cervical) plexus to the trigeminus, or irritation of the vagus. Seborrhea capitis, dilatation of vessels of the nose, cardiac rapidity and other sympathetic symptoms are frequently noted.

Trophic disturbances may likewise occur in pulmonary tuberculosis. Pigmentation of the face on the diseased side has been described. Herbert describes an increased amount of pigment in the iris on the diseased side. Jessen describes a case of hemiatrophy of the face. Jacquet found in such a case adhesions between the pleura and the inferior cervical ganglion. Loss of hair, softening and caries of the teeth, have also been noted. Increase in pigment upon the breast over the diseased side has also been described. The writer has seen this many times. The atrophy of the breasts, while not constant, seems to come under the head of trophic disorders.

Secretory disturbances are not uncommon. The upper extremities get their vasomotor nerves from the anterior roots of the mid-dorsal region. They pass through the sympathetic to the first thoracic ganglia, and from there through the rami communicantes to the brachial plexus. The skin of the trunk is supplied from the dorsal and lumbar nerves.

The lungs are supplied through the vagus and through the first thoracic ganglia. The heart gets its supply partly through the cardiac plexus, which contains accelerator fibres from the lower cervical and upper thoracic ganglia of the sympathetic and inhibitory fibres, partly through the vagus, and partly through the splanchnic. Also there are inherent cardiac ganglia. In the abdomen the great splanchnic governs sensation and there are also fibres from the vagus to the stomach. The lower extremities get vasomotor and dilator fibres from the lumbar and sacral plexi, and thus through the sympathetic.

The action of the vasomotor system shows itself more readily upon the fingers and toes, the nose and the ears. The sweat centre is controlled mainly by a dominating centre in the medulla, but it is thought that the impulses pass through the sympathetic system in connection with the spinal cord. Those for the extremities leave the cord from the fourth to the tenth and twelfth dorsal and also from the first to the third dorsal. Narracki and Langley claim direct spinal centres.

The symptoms observed in pulmonary tuberculosis from disturbance of these centres are: So-called night sweats; sweating localized to the hands or other parts of the body; hyper-or hyposecretion of the gastric juice; disturbances of the pulse—bradycardia, tachycardia; disturbances of the respiration; disturbances of the circulation—cyanosis, pallor, etc.; disturbances in the temperature, particularly at the time of menstruation.

Other symptoms observed are localized edemas, coldness of the extremities, increase in size of the finger-tips (pulmonary osteoarthropathy), dryness in the synovial sacs, and of the hair, and persistent low blood-pressure; the latter, however, is of toxic origin. This list by no means exhausts the symptoms from disturbance of the sympathetic centres, but only indicates the scope of the same.

In connection with the trophic disturbances it is noteworthy that Wheaton quite recently has described an atrophic condition of the integument over the diseased area in lung tuberculosis. It seems to be limited to the area involved and is characteristic of the condition. In general, this observation seems to be correct; whether it is secondary to the loss of tissue in the muscles or primary in the skin, is not certain.

It is only natural to mention the researches of Head in regard to the relation, which he has demonstrated to exist between the reflected pain in visceral disease and the depressed mood of the patient. It is quite generally true that (in the writer's observation, most certainly) in those cases of pulmonary tuberculosis suffering from depressed moods, a form of visceral reflex is to be demonstrated, or some of the neuritic phenomena are to be found. Head's explanation of this mechanism is so little quoted that the writer deems its mention here would be of value. In the writer's experience the tuberculous individual is not the happy, exalted person the older authorities make him out, and mental

depression is extremely common. The nervous phenomena in connection with the mental aberrations in tuberculosis need more scientific study.

Head states as follows: "All the thoracic organs and most of those in the abdomen receive fibres from the vagus. Impulses pass up these fibres to the head, and, according to the usual rules that govern the appearance of reflected pain, should be reflected along the somatic branches corresponding to the visceral afferent nerve of the vagus. Gaskell suggested that part of the fifth nerve corresponded to the somatic branches of that set of nerves of which the vagus represents the visceral branches. As a matter of fact, pain impulses ascending the vagus from organs in the thorax and abdomen actually do cause pain and superficial tenderness over certain areas of the scalp. The relation is a segmental one, and we cannot say that one area is connected with the heart, lungs, etc. Expressed broadly, the higher the area in the chest, the further forward its area on the scalp. Thus the third and fourth cervical and upper dorsal areas will be associated with areas of tenderness over the nose and forehead. The seventh, eighth, and ninth dorsal with temporal area; and the tenth dorsal with tenderness over the occipital region." Head proved conclusively that there is a close connection between depressed moods and reflected phenomena, and, the lower down in the chest, the more apt the depression is to be remarked.

"The greater the extent of progress of phthisis, the less mental phenomena appear, for rapid excavation of the lung destroys nerve-endings and thus prevents the production of reflected pain. Pleurisy pain did not show any phenomena associated with mental disturbance." The pain and tenderness over the lower segmental areas, according to Head, are more apt to be associated with depression because of the close association of these areas with the abdominal viscera, and pain and tenderness over the abdominal segmental areas are peculiarly apt to be associated with depression. The lower segmental areas of the lung are also associated with the upper abdominal areas; hence, disease in the lower lobes is more apt to be accompanied by depression. "Many a case of phthisis will remain entirely free from depression until some fresh affection of one lower lobe or some gastro-intestinal complication causes an outburst of tenderness over the lower dorsal areas."*

From the foregoing résumé one must conclude that in pulmonary tuberculosis certain definite neurological signs and symptoms occur. These disturbances produce phenomena in the sensory, the motor, and in the autonomic centres, and these are produced in several ways. First, in a mechanical, through intrathoracic anatomical changes; secondly, through a direct effect of the circulating tubercle poison (and its accompanying enzymes) upon the nerve tissues; thirdly, through the sympathetic pathways to the spinal segments according to Head's theory.

It does not appear to be known definitely whether the symptoms

*Brain, Part III, p. 376, 1901.

in some instances of neuralgia, paresis of the muscles, etc., are the result of simple nutritional or functional disturbances in the nerves or muscles, or whether a distinct neuritis is the causative factor. Anatomical investigations of the peripheral nerves abundantly show degenerative changes in the nerves, not only of the extremities, but also in the vagus, the phrenic, the spinal nerve-roots, and, in some instances, in the spinal cord itself. In many instances loss of reflexes, changed electrical reaction and paralysis, or atrophy, give the distinct picture of a neurological basis for the clinical symptoms. Furthermore, postmortem examination showed that in many cases the neuritis was latent—namely, there were no clinical symptoms before death. Furthermore, the frequent occurrence of hyperalgesia and other disturbances of sensation in the skin over the chest-wall, based on Head's segmental theory, leads us to believe that practically in every case, symptoms of such conditions exist. While in many instances the etiology is not clear, there being previous history of alcohol, syphilis, and other conditions, it is not the writer's conclusion that these are necessary causative factors. Many similar observations have been made when such influences were absent. The same may be said in regard to a neurotic or hysterical basis for these neurological findings. Therefore, it is the writer's belief that pulmonary tuberculosis causes distinct symptoms in the sensory, the motor, and the sympathetic systems; that these symptoms are specific for that particular case in that they result from the tuberculous lesion, either mechanically or as a circulating poison; and that further, to a more or less degree, one will observe these signs in every case, and the more closely one observes the more frequently they will be demonstrated.

The pathology of the muscle findings over the chest-wall has been partly considered by Pottenger. The muscles showed both degenerative and regenerative changes; sometimes the stripes were indistinct, at other times were entirely wanting. The muscle fibres took the stain poorly and at times were entirely destroyed. In some cases there was an increase of nuclei and a tendency to budding, indicating a regenerative process.* From the few published reports, an interstitial myositis (Senator) seems also to be the basis of the muscle atrophy in pulmonary tuberculosis.

Pottenger states, in searching for a cause for muscle spasm and degeneration in pulmonary tuberculosis, "the nature of the case is such that a reflex stimulation is the only thing that can be considered." From analogy with the muscle spasm found in appendicitis, and other abdominal lesions, and on the basis of the work of Head on the visceral reflexes, as well as the researches of Mackenzie, he comes to the conclusion that the muscle spasm is produced "by the inflammation in the lungs sending impulses through the sympathetic nerve to the cord, where they

_____
*From report furnished to Pottenger by Prof. Glion and Bartle of the Pathological Institute in Vienna.

impart to the cells of the segment, on the side of the involvement, a certain amount of irritability which shows itself peripherally, through the posterior horn, in changes in sensation, as described by Head, and through the anterior horn in muscular spasm and degenerations, as being in all probability due to the continuous irritation caused by the impulse from the lung and pleura, keeping up the muscle stimulation over a long period of time and being similar to the degeneration following excessive work." He quotes Adami to support the theory that excessive work over a prolonged period will cause atrophy of the cellular elements, particularly of the muscular elements. It does not seem reasonable to suppose that a muscle in spasm can be performing its function. There is nothing to show that the muscles of the chest over the diseased area of the lung are in reality doing an excessive amount of work. The expansion of the lung tissue is limited, the excursions are feeble, and if anything the actual work of the muscles of the chest is lessened. We cannot say that the spastic muscle over an inflamed appendix is doing more work. Nor does the element of work apply to the spasm and degeneration seen over tuberculosis of the kidney. Therefore, the writer does not feel that this theory has enough ground whereon to stand. As regards the disturbance of the trophic centres as indicated in the preceding pages, the writer believes we find a more valid explanation for these phenomena. The atrophy observed in the integument, the atrophy of the breasts in women, the disturbance in the sweat centres, the various phenomena enumerated under the heading of the sympathetic disturbances, as well as the frequent demonstration of actual neuritic changes, all point more logically to a trophic cause for the muscle degeneration.

From the segmental theory we get the basis for this reasoning; and Head has shown that there must be a close connection between the trophic centres and the pathways of the visceral reflexes. The trophic and sensory phenomena in the extremities support this view also. Therefore, the writer does not believe that the degeneration of the muscles of the chest-wall in pulmonary tuberculosis results from overwork, but from a trophic disturbance due to disturbance of the reflex pathways of the visceromotor and viscerosensory reflexes.

The further discussion of the nervous mechanism involved and the diagnostic limitations of muscle spasm and degeneration in pulmonary tuberculosis will be taken up in the next section of this paper.

THE BACTERIN TREATMENT OF PERTUSSIS.

By JOHN ZAHORSKY, M. D., of St. Louis,

Professor of Pediatrics, St. Louis University School of Medicine.

In spite of the patient work of numerous investigators, the bacteriology of whooping-cough has had a tortuous road to advance. The great difficulty lies in the fact that the upper-air passages contain an innumerable variety of micro-organisms even in health, and it is most difficult to find the true offending microbe among the vegetating parasites.

Poulet believed he had discovered the cause in a specific germ which he called *bacterium termo*.

Tshamer found some yellowish bodies in the sputum of pertussis patients, which proved to be spores of a fungus resembling Ustilago maydis, and which he claimed to be constantly present in the disease.

Afanassiew described an anerobic bacillus in the sputum of pertussis patients, a culture of which produced symptoms of bronchitis and bronchopneumonia in young dogs. His work was corroborated by several investigators.

A diplococcus was described by Ritter, but as diplococci are present in nearly every catarrhal affection of the trachea and throat, his investigation received little attention.

Deichler found horseshoe-shaped protozoa in the sputum, and others (Kourlow, Birch-Hirschfeld, Zursch) reported to have found these bodies.

Czaplewsky discovered a short, thick, bipolar, Gram-positive bacillus, or diplococcus. This micro-organism has been recognized as a pneumococcus. Later he described a micro-organism which resembled the influenza bacillus, and this finding was corroborated by numerous observers. (Koplik, Arnheim, etc.)

A bacillus discovered in the Hamburg Eppendorf Hospital by Jochmann and Krause also resembled the influenza bacillus and was called *bacillus pertussis Eppendorf*, but it shows a difference from the preceding bacillus in that it grows only on media containing hemoglobin.

A third type of this bacillus was discovered by Manicatide, which is Gram-positive, and grows on the ordinary culture media. He immunized sheep and horses, and produced a serum which was used with good effect in the cure of whooping-cough.

Leuraux described a similar bacillus in the nasal sputum of children suffering from pertussis. It is a short, thick, motile rod, Gram-positive, and a serum prepared had curative properties.

This by no means concludes the subject, numerous other investigators found micro-organisms in pertussis differing from those mentioned by some cultural peculiarity. It is difficult to formulate some conclusion from all these studies. Conclusive proof of its etiological relationship to pertussis has not been furnished to a single one of these micro-organisms.

A few years ago Bordet and Gengou* described a bacillus in the sputum of children suffering with pertussis, which has certain physical and cultural peculiarities, and the evidence that it is the specific etiological agent is constantly increasing. This is a small bacillus with rounded ends, not motile, without flagellæ, once or twice the size of the influenza bacillus. It occurs in different lengths, sometimes in pairs with joined ends, very rarely in chains. It stains very well with ordinary aniline dyes. Klimenko recommends a differential stain. A small bit of the bronchial mucus is placed on a cover-glass and dried in the air, it is fixed by heat and after cooling stained two or three seconds in a 5 per cent. carbolized solution of toluidine-blue. While all the micro-organisms are stained an intense blue, the bacillus pertussis shows a beautiful lilac color. This stain also shows the peculiar bipolar staining qualities of this germ. It has no capsules and is Gram-negative.

The bacillus is found in the sputum only in the early stages of the disease, and rapidly diminishes, to disappear entirely at the height of the paroxysmal stage. It is pathogenic to cats, dogs and monkeys. They succeeded in producing typical whooping-cough in monkeys by an insufflation of a culture of this germ. A strong argument that the Bordet-Gengou bacillus is the specific cause of whooping-cough is found in the fact that it is agglutinated in high dilutions by the blood of convalescent pertussis patients. Complement fixation tried by Frænkel has also resulted in establishing its causative relationship. The germ is not found in any other disease.

Bordet and Gengou attempted immunizing animals against this bacillus, but found that the immunizing process was very imperfect. Immune serum had little or no curative action against the disease. Furthermore, a soluble toxin could not be demonstrated in liquid cultures, but a powerful necrotizing substance could be obtained from the bodies of the bacilli. They conclude that like typhoid and dysentery bacilli, the bacillus pertussis produces disease by an endotoxin.

We know very little concerning the process whereby immunity is established against this disease. Is the immunity a local one? It is true that the pertussis toxin produces a local disease of the epithelium in the upper-air passages, and the new epithelial cells may acquire an immunity against the endotoxin; but whether the perfection of the immunity depends entirely on this local cellular change or an alteration of the serum, cannot be positively declared. Some intoxication of the body undoubted-

ly takes place. The characteristic change in the blood picture, the great irritability of the cerebrospinal nervous system, and finally the presence of antibodies as recently discovered, justify the conclusion that some general reaction and consequent production of a general immunity, at least in a measure, is established.

If, then, the cure of the disease depends, in a measure, on a general immunity, can we not hasten this process by the use of a bacterial vaccine or bacterin?

Several investigators have already reported their deductions from an experimental use of a pertussis bacterin; and without analyzing the various reports, in general it may be stated that in the majority of cases a distinct influence on the course of the disease is manifested. Some of these reports will be referred to later.

The writer has used a pertussis bacterin, prepared by Parke, Davis and Company, in 40 cases of whooping-cough in private practice. These were studied entirely as to the therapeutic result; in only 2 cases were blood examinations made for the purpose of establishing the diagnosis. The effect of the injections on the blood picture was not investigated. At a meeting of the St. Louis Pediatric Society, Dr. James R. Clemens stated that the lymphocytosis was materially diminished on the second and third day after the injection.

It will be most profitable to study the writer's series of cases in answer to questions.

Can the Child Be Immunized Even Temporarily Against Whooping-Cough?

In a previous communication* from observations made by several physicians at the Episcopal Orphans' Home and Bethesda Hospital, the writer concurred with Dr. White, who reported the cases, that a protecting influence could be produced in many cases, and we expressed the hope that by a larger injection the disease could be entirely prevented. At that time, the writer had 2 cases in private practice in which this immune-producing power was suggested.

Case I.—M. S., æt. seven, female, had been suffering from rheumatic endocarditis for two months previously. Her brother took whooping-cough and she was associated with him for fully one week. She received two injections of pertussis vaccine, 20 million each, three days apart. She did not take the disease.

Case II.—Baby R., æt. one month, female, brother had whooping-cough for ten days, received 20 million bacteria. Although she remained with her brother throughout its course, she did not contract the disease.

Immunity was also produced in Case XXXVII.

These, of course, are not conclusive. In another case, two previous

*Pediatrics, March, 1912.

injections of 20 million bacilli, two months before, failed to prevent the disease. The immune-producing power is, therefore, not lasting.

CASE III.—R. S., æt. two and a half years, female, had been suffering from recurrent attacks of asthmatic bronchitis since early infancy. The disease at the outset was diagnosed pertussis by another physician. The attacks of asthma recurred with annoying frequency, and as ordinary therapeutic measures gave little relief, two experimental injections of pertussis vaccine, four days apart, were given. She had another attack of asthma one month later with a second attack two weeks later. Following this last attack, typical whooping-cough of severe type developed. Because the writer feared a possible anaphylactic effect from the first dose, the child was not treated with vaccine.

The writer can record several failures since the above report, in which prompt injection did not ward off the disease.

CASE IV.—J. R., æt. one year, male, was exposed to pertussis, his sister having the disease for at least ten days, and received two injections of 20 million each, four days apart. Nevertheless, he developed a cough a few days later which, after a week, revealed the characters of whooping-cough. He was given four more doses at intervals of three and four days, and the disease ran a mild course, but continued for eight weeks.

CASE V.—D. S., æt. three years, female, exposed for ten days to whooping-cough through another child in the house. Received two prophylactic injections (20 million) two days apart. Whooping-cough began suddenly fifteen days later, the first coughing spell that the mother noticed showing a characteristic whoop. She received a subsequent injection, and the disease remained mild.

The peculiarity in this case is that the onset of the disease was retarded for more than a week, and then began suddenly without the premonitory catarrhal symptoms.

CASE VI.—B. M., æt. six weeks, male, one brother and sister had pertussis for more than a week. Exposure not very intimate nor protracted, as the baby was kept away from the other children. He received a large injection hypodermically, 70 million bacteria. Four days later a cough developed which, in a few days, resulted in very severe paroxysms. In spite of very large injections, the disease assumed a dangerous degree of severity.

The writer must conclude, then, that, during the stage of incubation, prophylactic injections of pertussis vaccine have a doubtful value in preventing the disease, a conclusion opposed to the one previously expressed. It must be admitted that some of the favorable cases were injected in the very early days of the period of incubation, while the cases in private practice were given the prophylactic dose rather late.

WHAT IS THE EFFECT OF THE PERTUSSIS VACCINE?

When a hypodermic injection of 20 million bacteria or more is administered, no general reaction is observed. In several cases, in which temperature determinations were made, no elevation beyond that usually

found in pertussis could be discovered. No local irritation occurred in any of the writer's cases. The pain from the injection is trifling. A few hours afterwards the cough seems to become worse, and this period (negative phase) extends over twenty-four hours with a moderate dose (30 million), but may extend over two or three days after a large dose (100 million). After this period of aggravation of the symptoms, a period of two to four days follows in which a great improvement is observed. Often this improvement is so striking as to be readily noticed. Such expressions as, "he slept all night," "the first night that I have had a rest," "only had one attack," "had several attacks but they were so mild that he did not wake up," were given by the mothers in fully one-half of the cases. Sometimes the effect is really remarkable.

CASE VII.—W. S., æt. seven years, male, has been coughing very hard for three weeks, but according to the mother's statement has never whooped, has repeated attacks through the night—the mother must get up every half-hour—coughs until he nearly strangles. A few days before the writer's first visit, a congestion of one eye was noticed which rapidly became worse. The other eye also became affected. This proved to be a severe subconjunctival hemorrhage of both eyes. The attacks of coughing were very hard and not controlled by full doses of bromides and codeine. On November 27th, 1911, 40 million bacteria were injected hypodermically. On the following night the cough seemed to be worse, but on the second night after this treatment the child had only one coughing spell, having had ten to fifteen a night for ten days. The eyes rapidly cleared up. No more injections were given.

CASE VIII.—C. F., æt. four, male, had been coughing for three weeks, the paroxysms had become severe with vomiting and especially frequent at night. On May 14th, he received 100 million bacteria hypodermically. For two nights there was little change, on the third night he slept all night and did not cough once, and for several days the mother did not hear him cough a single time. Then a slight paroxysmal cough returned which lasted two weeks longer. He felt weak, however, looked pale and had no appetite for some time after the use of the vaccine.

In about one-fourth of all the cases no effect whatever could be observed at the beginning or height of the disease.

CASE IX.—E. V., æt. four, male, had been sick two weeks and the cough was rapidly increasing in violence. The chest was clear of adventitious sounds. On December 13th, received 25 million bacteria. Cough became much worse, the injection brought out the whoops in full blast, and he had severe choking spells at night. On the 20th of the same month the same dose was repeated. Two days later the writer made the following note: "Bacterin had no effect, coughs harder than ever." The subsequent course does not differ from the average severe case of pertussis. In this patient the bacterin seemed to aggravate the disease. An interesting sequel was a severe relapse six weeks later when the cough had ceased.

CASE X.—C. B., æt. nine, girl, had been coughing two weeks. April 20th had very severe coughing spells and vomiting. Received 30 million bacteria with no effect whatever that could be ascertained. On the day following she broke out with a morbilliform erythema.

CASE XI.—C. C., æt. four, male, was sick only five days when first injection of 30 million bacteria was given (April 17th). The cough continued, and on the

20th of the same month the nurse counted twenty severe paroxysms in twenty-four hours. Gave 35 million bacteria. On the twenty-fourth the following note was made: "No effect as yet, coughs all the time, coughs all night, coughs almost continuously." Gave 50 million bacteria. The cough assumed a more paroxysmal character, but it ran the usual course of seven weeks.

Sometimes a temporary improvement which appears after the first injection does not occur after the repeated dose.

Case XII.—V. C., æt. eight, girl, had been coughing for ten days when the first dose was given. She had three or four attacks at night and vomited each time. Thirty million bacteria were administered (April 13th). On April 17th, still coughing very hard and the dose was repeated. On April 20th, the paroxysms had become very mild and vomited only once in two days. Another dose of 35 million was injected. On April 24th the following note was made: "No effect; coughs very hard; eyes swollen; vomits everything." On this day 50 million bacteria were injected. The disease gradually improved, but even after seven weeks, she still vomited her food.

There was quite a number of cases in which the effect was doubtful, but the course was mild and the injections were repeated several times. One example may be given here.

Case XIII.—F. D., æt. seven, male, had been coughing one week, was hoarse, feels tired, but has hard coughing paroxysms at night. Both tonsils red, glands in neck slightly enlarged, soft systolic murmur over heart. Pertussis was suspected and creosote and sodium bromide prescribed. One week later (April 13th) had developed paroxysmal cough of moderate severity. 25 million bacteria. April 22nd, whoops and sneezes very much, seven attacks at night, a few attacks severe. Has vomited a few times, complains of pain in stomach. 40 million bacteria. April 26th, comparatively mild case, feels very well, still has several attacks at night. 30 million bacteria. Subsequent course was favorable in every way but no striking effect of the vaccine. Similar histories might be given in 5 other cases, cases XIV, XV, XVI, XVII, and XVIII.

Rashes occurred in 3 cases in the writer's series, one of which has already been referred to (Case X).

Case XIX.—M. B., æt. four, female, was first seen May 10th, and mother stated that she had some coughing attacks at night for several days; otherwise she seemed well. On May 25th, mother reported that she whoops and had five very hard paroxysms that morning. Injected 70 million bacteria. On the following day was broken out with erythematous rash all over the body. The rash was in dusky-red patches, not wheals, and the patient complained that it itched and burned. Coughed very hard during the night. She improved very much after this injection, the effect lasting one week, then the attacks became worse again, but another injection caused the symptoms to abate. (See also Case XXX.)

Effect in Complicated Cases.

In cases in which the whooping cough is complicated with bronchitis or pneumonia the effect is uncertain and may do harm. In M. H. (Case XX), æt. sixteen months, suffering from pertussis and bronchitis

with moderate fever, three small doses (10 million each) were injected without any effect. A beneficial effect was obtained in B. S. (Case XXI), a girl of about three years, seen in consultation with Dr. Quinn who gave three injections (20 million each). She had high fever, great prostration, and considerable pulmonary engorgement. Dr. Quinn found quite a marked improvement in the coughing paroxysms some time after each injection, and the child recovered.

An unexpected fatal termination occurred in a little patient seen with Dr. Fuchs, as follows:—

CASE XXII.—E. J., æt. four months, female, contracted pertussis three weeks ago from her brother. She had been fed on artificial food since birth. She weighed 8 lb. at birth, and at three months, 12 lb. Is taking a mixture of milk, cream and oatmeal water. About a week ago she began to show high fever which has continued ever since. The temperature remains high constantly (103-104° F.). A few subcrepitant râles heard over left base. The stools were offensive, and urinary examination (Dr. Fuchs) revealed no urinary infection. Guaiacol was applied externally, in order to reduce the temperature. The coughing paroxysms had been very severe. At 6 p. m. she received 20 million bacteria, and at 9 p. m. a severe convulsive seizure ended in death within a very short time. Now the question was, did the vaccine inoculation aggravate the nervous symptoms? There had been no cerebral symptoms a few hours before the injection.

CASE XXIII.—R. C., æt. eleven, female, had been sick six weeks with a very severe attack of pertussis. The paroxysms were very severe and not controlled by any therapeutic measure. Bronchopneumonia, accompanied by great prostration and irregular fever developed about the third week. She was given two injections of 40 million each, three days apart, but no effect was observed either on the cough or the course of the bronchopneumonia, which lasted altogether about seven weeks.

CASE XXIV.—H. K., æt. two and a half, female, seen in consultation with Dr. Winter. Pertussis, bronchopneumonia, accompanied by severe cerebral symptoms had almost destroyed her life. Was treated by stimulants and the injection of human serum, and rallied from a collapse that seemed hopeless. The disease extended over three months, the lungs were very much inflamed, the emaciation extreme, and the healing power,, as shown by skin lesions, very low. Yet she gradually improved and more than two months after the onset of the illness the cough, which had been somewhat subdued during the severe part of the disease, became very much worse. An attempt was made to control this cough by injection of pertussis vaccine. Dr. Winter, however, reported that the injections (20 million) invariably made her worse for several days. This was a most remarkable case and deserves to be reported *in extenso* as a valuable addition to the literature of pertussis, but here we are concerned only with the effect of the vaccine.

THE PROPER DOSE.

In the first few cases about 10 million bacteria were used. Later 20 million, the contents of one vial, became the dose. The writer's most pronounced effects occurred when 30 to 50 million bacteria were injected. An attempt to improve the efficiency of the treatment by larger doses was met by a great increase in the length of the negative phase,

and sometimes in a retardation of the period of improvement; for instance, Case VI, already reported on account of the failure of producing immunity even with a large initial dose during the stage of incubation. She was breast-fed, and six weeks old at the onset of the illness. She received four injections at intervals of four to five days, each 70 to 100 million, and yet the coughing paroxysms were as severe as the writer has ever seen. She had to be watched day and night by skilled attendants, artificial respiration had to be used several times a day to restore the breathing. She would become cyanotic and finally pale and limp. Yet a short time after each attack she felt very well. Stimulants had to be given, bromides had no effect. Ten to twelve attacks were usual during the night. No complication occurred, and she made a good recovery after seven weeks.

On the other hand, one good dose (100 million) may almost cure the disease as in Case VIII. A good effect by one large dose was also observed in another instance:—

CASE XXV.—L. M., *æt.* seven and a half, male, had been coughing for four weeks. Violent attacks of coughing were usually followed by vomiting. Coughs every hour and the attacks last one to three minutes (mother's report). One injection of 100 million changed the entire clinical picture. Four days later the report was that he had stopped vomiting and had had only very few paroxysms that day.

It will be seen that 100 million bacteria is not a dangerous dose, and yet the results have been equally as good from half that dose without the corresponding aggravation of symptoms during the twenty-four to thirty-six hours following the injection.

THE PRODUCTION OF IMMUNITY.

If the Bordet-Gengou bacillus is the real cause of pertussis, the writer's observations would corroborate the experimental work of Bordet in that it is difficult to immunize against the bacillus pertussis. This seems especially true of young infants. Even repeated injections did not seem to shorten the disease. It takes time to produce immunity.

CASE XXVI.—J. T., *æt.* three months, male, had been artificially fed since birth, on account of a nutritive disturbance, and was not well nourished. Weight at birth 5¾ lb., present weight, October 25th, 1911, 9 lb. A few ounces of human milk were obtained and given daily with a cow's milk mixture. During the last week has coughed, the paroxysms becoming more severe. His two sister have had pertussis for three 'weeks. He received the following injections of pertussis vaccine: October 25th, 10 million; November 3rd, 20 million; November 10th, 20 million; November 17th, 20 million; November 20th, 20 million. After these injections, great improvement. The mother observed that after each injection the cough would be better for several days. During the latter part of November still coughed very hard. By the middle of December cough had almost ceased. In January, 1912, he contracted a "grip" infection, and with this the paroxysms of pertussis recurred with great violence. He received another injection of 20 million bacteria.

It is pertinent to ask, since the vaccine does not show any great value in inducing a permanent immunity, how can we explain its favorable action? Of course, this is not yet positively known, but its effect is probably analogous to that produced by other bacterins; the phagocytosis is diminished and then increased. During the positive phase the bacteria are probably diminished in number and toxins enter the blood in lessened quantity.

Is This Action Specific?

Here we enter unexplored territory, which can only be traversed by experiment.

We know that pertussis is often temporarily modified by other infections; for example, an attack of pneumonia or tonsillitis usually diminishes the intensity of the paroxysms. Hypodermic injections of horse-serum also have a modifying influence. The curative action of vaccinia has been attested by too many clinicians to permit of any question that the general disturbance from vaccination often diminishes the symptoms from pertussis.

The Effect on the Child's Condition.

An attempt was made to determine the effect of the bacterin injection on the physical signs. Fully two-thirds of the cases had some of the physical signs of bronchitis. It could not be made out whether the pertussis vaccine diminishes or increases the bronchial secretions. In no patient could a bad effect on the nutrition be discovered. In not a single case in which the vaccine was used did any secondary infectious process appear, which indicates that the general immunity was increased. Freedom from complications then is one of the favorable effects of the vaccine treatment. The influence of this vaccine, in a subsequent course of pneumonia in the same patient, was illustrated by one case, and indicated that the resistance is not lessened.

The Interval For Injections.

Since injections of vaccine diminish, for a short period, the resistance and often aggravate the clinical symptoms, these should not be repeated too frequently. The interval should not be less than three days when moderate doses are used (10 to 20 million). If large doses (20 to 100 million) are given, the interval should be at least five days.

Early or Late Injections.

Since the writer has not succeeded in aborting the attacks by using the vaccine early, and since his best results were produced at the height of the disease, it has become his practice to wait until the disease is well advanced, and then by giving two or three full doses to modify the severity

of the symptoms. Nothing that the writer has tried will act so well as this vaccine, often changing the disease in twenty-four hours to a remarkable degree. In young infants moderate doses should be given early. The whole course, then, will not be so severe and complications will be minimized.

Early injections were given in a number of infants, and all with the exception of B. M. (Case VI) passed through all phases without causing any anxiety.

Synopsis of Additional Cases.

Case XXVII.—F. C., æt. four, male, injection of 40 million in fourth week of disease. Five days later mother reported that he was doing fine and had had no bad paroxysms. Very good result.

Case XXVIII.—V. C., æt. twenty months, male, sick three weeks when he received first injection (25 million). Diarrhea set in two days later, which complication continued for one week. Another injection, five days after the first, produced a marked change for the better, the coughing attacks becoming very mild.

Case XIV.—R. B., æt. eighteen, female, severe attacks of whooping-cough, has very severe attacks of coughing, almost chokes. Received 30 million bacteria on the sixteenth day. Four days later the mother reported that she vomits nearly everything. Another injection of 40 million produced only slight and temporary amelioration of the symptoms, but no complication ensued.

Case XV.—F. D., æt. three years, male, had a moderately severe attack of pertussis. Two injections (20 and 30 million) produced no marked effect.

Case XVI.—W. H., æt. three, male, sick with pertussis two weeks with gradually increasing coughing paroxysms. Received 25 million and four days later 30 million. The disease remained mild and showed the physical signs of bronchitis with a subfebrile temperature, 100 to 101. He received a third injection, and after this a marked amelioration of the paroxysms was noticed; the night attacks fell from 10 to 5 and became much milder.

Case XVII.—G. K., æt. four, female, sick about two weeks when one injection was given (40 million). A week later the mother reported that she was doing very well and no other dose was given. She also received bromides and codeine at night.

Case XVIII.—J. P., æt. three and a half, male, rather delicate boy, had pertussis four weeks, the cough at first continuous, then in severe paroxysms, which terminated in vomiting. Retained very little food. Received one injection of 60 million bacteria. Only temporary improvement, continued to vomit with each paroxysm for three weeks more. He became very much emaciated but made a good recovery.

Case XXIX.—R. P., æt. seven months, male, breast-fed, contracted the disease from his brother. Had marked catarrhal symptoms at the onset, the coughing attacks were very severe resulting in cyanosis and apnea. After two weeks of the disease received 50 million bacteria. Two days later the attacks had rather increased, but an improvement was noticeable after this. Another dose was given fifteen days after the first when the disease was still very severe. Recovery was slow.

Case XXX.—L. M., æt. eleven months, male, was exposed to whooping-cough about two weeks before. Bottle-fed but well nourished. Had been coughing for a few days. Received 20 million bacteria. The night following had several vomiting attacks. The vomiting continued for two or three days. Fever de-

veloped at the same time (102° F.), and the baby was very sick for several days. On the fourth day of fever broke out with morbilliform rash. Coughing attacks had become worse, and vomited each time. Received two other injections two weeks after the first, after which the symptoms abated rapidly and the subsequent course remained very mild. The effect after the second injection was striking.

CASE XXXI.—J. L., æt. twenty months, female, began with severe catarrhal symptoms and the disease was not recognized for three weeks. Received 100 million, May 9th. Four days later another 100 million was given, both injections producing very little effect. A marked increase in the coughing occurred after the first injection, and temperature was 99.4° F. on the morning following. May 17th, vomited with coughing attacks but seems very much better. Feels good, slept fine, chest clear. May 19th, the cough being worse again another injection was given (80 million). Four days later mother reported that she had only one attack during the night but still vomits with each severe paroxysm. She received sodium bromide and codeine during the severest part of the disease.

CASE XXXII.—R. K., æt. fifteen months, female, had severe catarrhal symptoms, began to whoop almost from the first. Was sick one week when she received 60 million bacteria, May 7th. Other injections were May 9th, 100 million; May 15th, 20 million. May 11th, physical signs of bronchitis the same, but coughing attacks less frequent and less severe. The symptoms continued to improve and two days later the mother thought the disease was almost well. May 17th, great improvement, appetite better, feels good but looks pale.

CASE XXXIII.—M. R., æt. three, female, moderately severe case of whoopingcough, received one dose (35 million) at two weeks of her illness. The disease remained so mild that no second injection was given.

CASE XXXIV.—A. H., æt. six, male, has had a mild spasmodic cough for three weeks which resisted ordinary treatment. A leucocyte count—white corpuscles 11,500, lymphocytes 60 per cent.—suggested pertussis. Received two injections, 35 million each, three days apart. After each injection great reduction in coughing spells.

CASE XXXV.—J. W., æt. ten months, male, moderately severe pertussis. Received two injections, 50 million each, four days apart, the result is unknown.

CASE XXXVI.—D. D., æt. two and a half, female, sick three weeks. Received three injections (50 million each) about four days apart. Remained very mild, and she did not whoop.

CASE XXXVII.—B. D., æt. six weeks, sister to the preceding patient, breastfed. Received three injections of 20 million bacteria, four days apart. She did not take the disease. Apparently this was a successful immunization.

CASE XXXVIII.—J. S., æt. five, male, had a persistent spasmodic cough, lasting for two months. This was finally diagnosed as pertussis by finding a lymphocytosis. He received one injection (50 million), and thereafter the cough became much better.

CASE XXXIX.—A. R., æt. eighteen months, female, had been coughing two weeks when first injection was given. Received 20 million (March 19th). Three days later received the same dose. Four days after second injection had only four attacks during the night, but suffered from diarrhea. March 31st, 25 million were administered. April 6th, was much better for a few days after injection, but cough had returned as bad as ever. Diarrhea had ceased. Improvement gradual.

CASE XL.—F. S., æt. nine, male, has been suffering with severe recurrent attacks of asthmatic bronchitis. The history indicates that pertussis was the cause. Experimentally, he received two injections of pertussis vaccine (20

million). The effect was very good. The attacks were reduced in number and severity so that he could attend school again, which he had not done for several weeks.

It should be stated that nearly all these children received sodium bromide and codeine in order to control the cough. During convalescence several received quinine. The good effect was in no instance due to these drugs, as they had been given before the bacterin was administered.

Conclusions.

Pertussis bacterin in doses of 30 to 50 million is a very helpful therapeutic resource.

It should be given hypodermically every three or four days in infants from the very beginning; in older children at the height of the disease.

It is questionable whether it hastens permanent immunity.

1460 S. Grand Avenue.

THE AUSCULTATORY BLOOD-PRESSURE PHENOMENON: A PRELIMINARY REPORT ON THE CLINICAL DETERMINATION OF DIASTOLIC PRESSURE.

By LOUIS M. WARFIELD, A. B., M. D., of Milwaukee,
Assistant Superintendent Milwaukee County Hospital, Wauwatosa, Wis.

With our increasing knowledge of the circulatory mechanism, it has become more and more essential to have instruments of precision which will enable physicians at the bedside to measure the work of the heart. During the past few years, many new instruments have been devised and some new methods have been recommended which have made it possible to determine, with increasing accuracy, the real values for blood-pressure.

Graphic methods for determining blood-pressure in man began with the attempt of Vierordt, in 1855, to measure the blood-pressure by placing weights on the radial pulse until this was obliterated. The first useful instrument, however, was devised by Marey in 1876. He placed the hand in a closed vessel containing water, connected this by tubing with a bottle for raising the pressure, and by a second tube with a tambour and a lever for recording the size of the pulse waves. He maintained that when pressure on the hand was made, the point where oscillations of the lever ceased was the maximal pressure, the point where the oscillations of the recording lever was greatest was the minimal pressure. This pioneer work was practically forgotten for twenty-five years.

It was not until 1887 that von Basch devised an instrument which was used to some extent. This instrument recorded only maximum pressure. It consisted of a small rubber bulb filled with water communicating with a mercury manometer. The bulb was pressed on the radial artery until the pulse below the artery was obliterated, and the pressure then was read off on the column of mercury. He later substituted a spring manometer for the mercury column. Potain modified the apparatus by using air in the bulb with an aneroid barometer for recording the pressure. These instruments were necessarily somewhat inaccurate. Moreover, they did not record the diastolic pressure.

In 1896 and 1897 further attempts were made to record blood-pressure by the introduction of a flat rubber bag encased in some unyielding material which was placed round the upper arm and blown up by air pressure. Riva-Rocci used silk, while Hill and Barnard used leather. The latter used a bulb or Davidson syringe to force air into the cuff round the arm; and they palpated the radial artery at

the wrist, noting the point of return of the pulse after compression of the upper arm, and reading the pressure on a column of mercury in a tube. Except that the width of the cuff has been increased from 5 cm. to 12 cm., this is the general principle upon which all the blood-pressure instruments are based. Recent modifications have introduced a dial recorder the principle of which is the expansion of air in a chamber between two thin metal discs. As these must be calibrated with a mercury instrument, the statement above holds good.

The cuff was made 12 cm. in length because it was shown by von Recklinghausen that with a narrow cuff much pressure was dissipated in compressing the tissues. Janeway has shown that with the use of the wide cuff accurate values are obtained independently of the amount of muscle and fat round the brachial artery. In other words, if an actual systolic blood-pressure of 140 mm. Hg. is present in two individuals, the one with a thin arm, the other with a thick arm, the instrument will record these pressures the same when the wide arm-band is used.

Fig. 1.—Showing a drop before 4th sound. A small pulse wave.

Our present nomenclature includes three terms which will be defined and briefly discussed.

(1) Systolic or maximum pressure is the maximum force exerted by the systole of the heart. It is the intraventricular pressure. The maximum pressure measured in the brachial artery tends to approximate the intracardiac pressure and the lateral pressure in the aorta. The maximum pressure then measures the force exerted by the heart in order to overcome the minimal pressure in the aorta plus the force necessary to carry on the circulation in equilibrium. At the present time there are three methods of measuring this systolic pressure: (a) By palpating the return of the pulse in the radial artery after compression of the upper arm; (b) by using a drum and recording lever and noting the onset of sudden increase in amplitude of the lever's oscillations; (c) by auscultating over the brachial artery just below the cuff and noting the first sound heard when the pressure in the cuff is gradually lowered.

(2) Diastolic or minimum pressure is the pressure in the smallest arterioles and measures the peripheral resistance. As the blood goes farther and farther from the heart into the small arterioles, the systolic tends to approach the diastolic pressure. The diastolic pressure varies

but little in all the large arteries. A high peripheral resistance therefore means a high diastolic pressure, a low peripheral resistance means low diastolic pressure. In other words, vasoconstriction raises the diastolic pressure, while vasodilatation lowers it.

(3) The pulse-pressure is the difference between the systolic and diastolic pressures, and represents the actual head of pressure driving the blood toward the periphery.

Altogether too little attention is paid to the determination of diastolic and pulse-pressure. The difficulty of accurately measuring diastolic pressure probably has led to this neglect. There are in use four methods of measuring diastolic pressure, but only one, or at most two, is at all accurate: (a) By palpating the radial pulse and noting the maximum wave felt—this is inaccurate and difficult to measure; (b) noting the maximum oscillation of the mercury column or, in a dial instrument, the maximum fling of the lever; (c) by recording pulsations on a revolving drum and noting the point of maximum oscillation of the tambour lever (Erlanger's instrument); (d) by auscultating over the brachial artery below the cuff and noting the point when all sound disappears as the pressure is reduced. Unfortunately the most accurate method (Erlanger's) is practically impossible for general bedside work.

We cannot determine the pulse-pressure unless we have measured the diastolic pressure. It is not so much the knowledge of the pressure under which an organ receives its blood, as it is from the knowledge of the amount of blood an organ receives per unit of time, that we are enabled to judge of functional capacity. It is, therefore, important to know the velocity of the blood. Now, there is within limits a very definite relationship between pulse-pressure and velocity. Within these limits, theoretical as well as experimental, the velocity of flow is equal to the pulse-pressure times the pulse-rate. This must not be literally interpreted in all cases, however, as there are many factors which vitiate this simple formula. In order to calculate accurately the absolute velocity of blood flow, knowing the two factors—pulse-rate and pulse-pressure, it is necessary to know at least four constants which themselves vary at times, but in any given regularly-beating heart they are factors which give negligible values. These are (1) rate of systolic output; (2) rate of flow from arteries into veins; (3) distensibility of human arteries at different pressures; (4) the amount of blood in the systemic arteries under various conditions. In general then, a diminution of the pulse-pressure means lessened velocity of blood flow. This has occurred with pallor, clammy perspiration, weak and rapid pulse—in short, syncope.

The maximum pressure may be high, but if the minimum is only proportionally high and the pulse-pressure is increased over the normal, the circulatory system is better able to carry on the circulation than where the minimum approaches the maximum and pulse-pressure is low. In a failing heart the maximum approaches the minimum until

the pulse-pressure is nil; when the heart ceases to carry on the circulation, there is not force enough to overcome the minimal pressure in the aorta. It is, therefore, believed that an observation of the blood-pressure which records only systolic pressure is but a part of an observation.

In 1905, Korotkow discovered that by placing the bell of a stethoscope over the brachial artery from 1 to 2 cm. below the cuff, he could hear very characteristic sounds when the pressure was released. He noted three sounds. Further observations by Ettinger, Fischer and others have shown that normally there are five so-called phases which are as follow.

The first phase is a more or less sharp, clear tone which corresponds to the first pulse wave to get under the cuff. The second phase is this tone more or less clear plus a series of murmurs. The third phase is a transition to a loud, sharp, clear tone which suddenly or gradually becomes dull (fourth phase), and finally ceases altogether, no sound being heard (fifth phase).
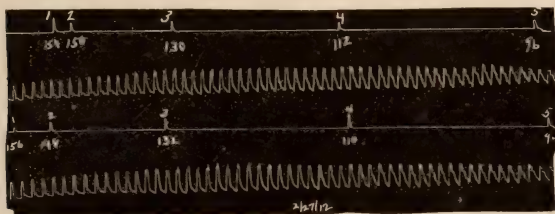
Fig. 2.—Showing maximum after 3rd sound, a second maximum at 4th, and a sudden drop about halfway between 4th and 5th.

It is generally accepted that all the sounds are produced in the part of the artery below the cuff. It is absolutely essential that one listen as near the lower edge of the cuff as possible and directly over the brachial artery. The first sound is thought to be produced by the small amount of blood which rushes under the cuff at considerable velocity just at the point when the intra-arterial pressure is greater than the extra-arterial pressure produced by the air-bag round the arm. As the pressure is now gradually lowered there is more and more blood passing through under the cuff at every systole. As the artery below the cuff is collapsed and greater in diameter than the compressed part of the artery, whorls are set up which produce the second murmur and sound phase. The third phase is the loudest sound, and is probably due to the full expansion of the artery below the cuff; the artery under the cuff and the part below the cuff becoming of equal size at every systole. As more and more blood now enters, the artery below the cuff becomes more of normal size and the sound becomes dull. When

there is no pressure exerted on the artery below the cuff, the whole vessel is normal in size and no sound is heard—the fifth phase.

It is held that the first sound measures accurately systolic pressure. This can be readily seen on records which we have made with the Erlanger instrument. Korotkow found that by the auscultatory method the systolic pressure was from 10-12 mm. higher than by the palpatory method. Gittings, in a study of 63 cases, found in 61 that the average systolic pressure was 16.7 mm. higher by the auscultatory method. The writer's results show values of from 8-14 mm., and they show the coincidence of systolic pressure with the appearance of the first phase.

All five phases are not by any means always to be differentiated. The tones are dependent on three factors: strength of the heart-beat, the size of the artery, and the elasticity of the artery. The third tone normally is the loudest. The most intense sound, almost ear-splitting, was heard over a large, highly elastic artery in a subject who had aortic insufficiency and an enormously hypertrophied heart.

It is generally agreed that a loud, long, clear third phase indicates strength in the heart; a weak third phase shows weakness, and a disappearance of this phase indicates great weakness. The latter is found in decompensated hearts.

A strong third phase may show a powerful heart provided that the artery is not sclerosed. We find that in arteriosclerosis, even with only a fairly strong heart, there is a good third phase. A weak heart pumping blood into a somewhat rigid artery may then produce as loud a sound as a strong heart pumping blood into a normal elastic artery.

Goodman and Howell called attention to the irregularity in strength and quality of the sounds in cases of irregular hearts. They called the phenomenon tonal arrhythmias, and they believed that they were able to detect slight irregularities in the force of the heart-beats by employing the auscultatory phenomenon more readily and surely than by auscultating over the heart itself. They also called attention to the measurements of phase length and the percentage of the lengths to the total pulse-pressure. They also thought that it was important to note the points in the whole sequence where tonal arrhythmias were most noticeable. They added the second and third percentages of the pulse-pressure together and called it C.S. (cardiac strength), the first and fourth they called C.W. (cardiac weakness). Normally when the pulse-pressure is 45 mm. Hg., C.S.: C.W.:: 55.5: 44.4. In decompensated hearts C.W.>C.S. This carries out farther the observation that a loud, long third phase denotes cardiac strength. Goodman and Howell used the point, at which all sound disappeared, as the one to measure diastolic pressure.

One conclusion drawn by these authors was that the persistence of the fourth phase was pathognomonic of aortic insufficiency. This we can confirm; but the converse proposition that in aortic insufficiency there is no fifth phase ever heard is not in accord with the facts.

Most observers are agreed that the disappearance of all sound measures the diastolic pressure; in fact, this point seems to be universally used. It was proved by Erlanger with an artificial circulation schema that diastolic pressure occurred at the point of maximum oscillation of the lever in his instrument. He had previously shown the absolute accuracy of the instruments. While taking blood-pressures with the auscultatory method, it was noticed by the writer that more often than not, the disappearance of sound was below the point of maximal oscillation of the mercury or of the dial hand. This led to an investigation of this point. One of the tambours on the Hirschfelder attachment to the Erlanger instrument was fitted with a pipette bulb and made to write on the drum just above the brachial pulse lever. As the pressure was reduced and the sounds were heard, slight pressure on the bulb made a mark on the revolving drum at the point where
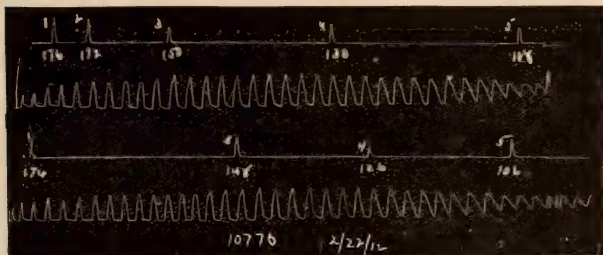
Fig. 3.—Showing maximum at 3rd sound, a sudden drop just at or after 4th, with a second marked drop at 5th. The diastolic pressure is considered to be nearer 4th than 5th.

the sound was heard. It soon became evident that the point of maximum oscillation by the method of continuous escapement did not coincide with the disappearance of sound, but that in practically all cases it was below maximum oscillation. In some cases the difference amounted to 12 mm.; in other cases, especially when the fourth phase was very short, there was a difference of only 2 to 4 mm., figures which are negligible. However, the writer's records seem to show that it is not correct to take the fifth phase as the point for determining diastolic pressure. Just where that point is, and just how we can determine the exact diastolic with the accuracy with which we can determine the systolic, has not been definitely found as yet. Further clinical records and animal experiments are now in progress, and it is hoped that this important point may before long be determined.

There are cases when the transition from the third phase to the fifth is so sudden that the fifth phase can be used as the point of diastolic pressure. Certainly this point is practically always easily determined, and for the present it should be used to read the diastolic pressure.

In Erlanger's original experiments with his artificial circulation schema, he noted the fact that at the point of maximum oscillation of the tambour lever, the artery expanded to its fullest extent and during the diastole the walls just met. This produced a clicking sound which could be easily heard when the ear was placed near the strip of artery. This is interpreted by us to be confirmatory of the point here made.

In conclusion, the following points seem to be established.

The auscultatory method of determining blood-pressure is the best, simplest and most accurate method for determining the systolic pressure. The third sound is normally the loudest, and a loud, long third sound usually means functional heart strength. Failure or weakness of the third sound indicates a weak heart.

Irregularities in the force of the heart-beats are more easily discovered by the auscultatory blood-pressure method.

The measurement of diastolic pressure is equally as important as the measurement of systolic pressure.

The diastolic pressure is not usually at the point of disappearance of all sound—the fifth phase.

Explanation of Illustrations.

In all figures the numbers 1, 2, 3, 4, 5 refer to the phases in the auscultatory phenomenon. The figures below the above refer to mm. pressure as read off on the Erlanger sphygmomanometer at the points when the different sounds were heard. The drum was revolving a little too fast. The pressure was falling in all cases at the rate of about 2 mm. for every heart-beat.

Fig. 1. In this pulse the 4th and 5th came so close together that the diastolic could well have been taken at the 5th phase.

Fig. 2. In this record can be seen the change in the form of the pulse wave at 3, a notch on the ascending limb. The curve then becomes level at the summit for a short distance, and at 4, assumes the normal curve of the pulse. The diastolic is considered to be near 4.

Fig. 3. In this record a condition is shown much like the preceding curve. The diastolic pressure is considered to be between 126 and 130 mm. Hg.

REFERENCES.

Erlanger: A New Instrument for Determining the Minimum and Maximum Blood-Pressure in Man. (*Bulletin Johns Hopkins Hospital*, Vol. XII, p. 53, 1904.)

Erlanger and Hooker: An Experimental Study of Blood-Pressure and of Pulse-Pressure in Man. (*Bulletin Johns Hopkins Hospital*, Vol. XII, p. 145, 1904.)

Janeway and Park: An Experimental Study of the Resistance to Compression of the Arterial Wall. (*Archiv. Int. Med.*, Vol. VI, p. 586, 1910.)

Gittings: Auscultatory Blood-Pressure Determinations. (*Archiv. Int. Med.*, Vol. VI, page 196, 1910.)

Goodman and Howell (*Univer. Pa. Med. Bulletin*, Vol. XXIII, p. 469, 1910).

Goodman and Howell (*Amer. Journ. Med. Sciences*, Vol. CXLII, p. 334, 1911).

THE RESULTS OF THE EARLY DIAGNOSIS OF URINARY TUBERCULOSIS.

By WILLIAM F. BRAASCH, M. D., of Rochester, Minn.,
Physician to St. Mary's Hospital, Mayo Clinic, Rochester, Minn.

Notwithstanding the fact that much has been said and written within the past few years concerning tuberculosis of the kidney, many of the patients suffering with this disease are not referred for operation until the process is well advanced. Up to January 1st, 1912, the records at St. Mary's Hospital, Mayo Clinic, show that 212 patients were operated upon for renal tuberculosis. Of this number, 159 (71 per cent.) had symptoms suggestive of renal tuberculosis which had extended over a period of more than one year; 37 (17 per cent.) over five years, and 13 (6 per cent.) over ten years. Only 61 patients (29 per cent.) had symptoms of less than one year's duration and but 21 (10 per cent.) less than six months. During the past ten years we have examined 71 patients, who, because of complications or because both kidneys were diseased, were regarded as inoperable. Of this unfortunate number, 61 (86 per cent.) had symptoms of renal tuberculosis extending over a period of one year; 34 (48 per cent.) over five years; and but 10 (14 per cent.) less than one year.

The question naturally arises, How is it possible that the tuberculous process should be allowed to go on so long without surgical intervention? The more important reasons appear to be as follow: (1) The true nature of the disease still too frequently remains unrecognized by the general practitioner; (2) it is not generally known that surgery is the best means to cure tuberculosis of the urogenital tract; (3) there exists a widespread belief that renal tuberculosis can frequently be cured by means other than surgery, particularly through the use of tuberculin.

That the presence of renal tuberculosis is usually recognized through the irritability which it causes in the bladder is a fact frequently disregarded. For the best interests of the patient, it would be well to regard every case of *diurnal* irritability of the bladder, persisting over a period of several months and accompanied by more or less pyuria, as due to renal tuberculosis until it can be proved otherwise. However, we undoubtedly meet with a large number of cases of irritability of the bladder from causes other than renal tuberculosis. Excluding those patients having symptoms of prostatic and urethral obstruction, we have examined, during the past year, 327 patients complaining of irritability of the bladder, and a diagnosis of renal tuberculosis was made in but

39 of these. The remaining cases may be grouped into two divisions: (1) Those with little or no actual inflammation of the bladder; (2) those with cystitis. The first group is by far the larger, including 201 patients in whom cystoscopic examination showed little or no inflammation. This group of cases is composed largely of women of the fourth or fifth decade, and with many the vesical symptoms seem to be a form of neurosis. The majority of these cases can be recognized by the fact that the patients have little or no nocturnal frequency, and also by an examination of their urine, which usually shows little or no pus. The symptoms, however, while extending over a period of months or years will not be persistent. The other group of non-tuberculous cases was composed of the following forms of cystitis: (1) Non-specific cystitis; (2) pyelitis and cystitis; (3) cystitis accompanying vesical neoplasm and stone; (4) cystitis with infections in the prostatic urethra. This second group might readily be confused with renal tuberculosis, since considerable pus and persistent irritability of the bladder may be common to both. These cases will require further differentiation. While vesical symptoms usually first call our attention to the existence of a renal tuberculosis, occasionally the initial symptom will be a pain, referred to the affected kidney, which may become very severe. In exceptional cases a sudden hematuria will be the first indication of the infection. However, these symptoms are early accompanied by irritability of the bladder and various other evidences of renal tuberculosis. Strange to say, the most common diagnosis and the condition for which many patients had been treated was that of Bright's disease. The diagnosis was frequently made because albumin was found in the urine, no further urinary examinations being made. Gonorrhea was also often assigned as the cause of the vesical symptoms, in spite of the fact that Neisserian infection is found in comparatively few cases as a cause of cystitis.

Given, therefore, a patient with persistent irritability of the bladder, what steps are to be taken to determine whether or not the symptoms are caused by renal tuberculosis? First, a careful examination of the urine. If no pus be found, even through microscopic examination, tuberculosis can be excluded in most cases. With pus present in considerable quantities, the early diagnosis of tuberculosis becomes largely a problem of demonstrating the presence of the tubercle bacillus. It is peculiarly true that sputum is examined for tubercle bacillus as a matter of routine by hundreds of clinicians, but the urine seldom is examined, although the technique is practically the same. The tubercle bacillus can be found in the urine of practically every case of early renal tuberculosis if looked for repeatedly. If, however, with a case of persistent diurnal irritability of the bladder and pyuria, the tubercle bacillus cannot be found microscopically in a catheterized specimen of urine, and we have reason to suspect its presence, a guinea-pig should be inoculated with

the sedimental urine. Particularly in early infection is the guinea-pig test practically infallible, and it is unfortunate that because of the expense, technical difficulties and length of time involved, the method is not more generally available. The diagnosis of early renal tuberculosis, therefore, will be largely dependent upon these two methods.

When, however, the guinea-pig test is not available, and the microscopic examination is necessarily uncertain, we have other evidence which is corroboratory of the condition—namely, cystoscopic and physical examination. The presence of nodular enlargement of the epididymis or prostate is of particular value in physical examination, and it should be looked for in every case of irritability of the bladder in the male. In fact, when such enlargement is found in a young adult, without recent venereal infection, or nocturnal frequency, the diagnosis of renal tuberculosis can be made safely. Thickening of the ureter, renal tumor, temperature, loss of weight, radiographic data, etc., usually appear later in the progress of the disease. Without going into the details of the cystoscopic picture of the tuberculous bladder, suffice to say that while it is not necessarily pathognomonic, particularly in the early stages, it can, nevertheless, usually be recognized by an experienced observer. The various tuberculin reactions, including cutaneous and Calmette's tests, are not of great practical value, since, while a positive reaction may be indicative of tuberculosis, it is of no value in localizing the process.

Localization of the disease is the next and a very important step to complete our diagnosis. This is entirely a question of cystoscopic technique, and it is frequently a most difficult one even in the hands of an experienced observer. By means of the cystoscope we are able to determine (1) the degree and character of infection in the bladder; (2) whether infection is secondary to the kidney or to the epididymis and prostate; (3) which kidney is involved and the degree of involvement; (4) to a certain extent the functional capacity of the remaining kidney; (5) whether both kidneys are involved.

Granted, therefore, that negligence accounts to some extent for the fact that the true nature of the irritability of the bladder, in a large percentage of cases of long standing, is not recognized, there is still unfortunately an increasing proportion in which the nature of the disease has been recognized, but treated by non-surgical measures. The various methods by which renal tuberculosis has been claimed to be cured are as follow: Spontaneous, climatic, heliotherapy and tuberculin. Within the last few years we have records of a number of patients who have been treated by various means, and particularly with tuberculin over a period of several months or years, before presenting themselves for operation, and in none of whom was any marked improvement noted. While it may be true that incipient renal tuberculosis may occasionally recover spontaneously, it has been our experience that such a case

is so exceptional that it should not be relied upon. Our files, up to January 1st, 1912, record 283 cases diagnosed as renal tuberculosis. 212 patients have been operated upon, leaving 71 who were not operated upon. Of those not operated upon, we were able to trace 48. Ten patients were reported alive; 2 between five and ten years, 4 more than three years, and 4 more than one year. Of this number, we have found but 3 in whom the tubercle bacillus has disappeared from the urine and in whom the vesical symptoms have ceased. Two of these cases are of less than five years' duration and the third is of eight years' duration. It is of interest to note that the 3 patients were young adults, less than twenty years of age, in whom the progress of the disease is usually more rapid than in patients above forty. There are left then 38 patients who are known to have died, or a non-operative mortality of 80 per cent. These figures probably do not represent the exact truth in leaving the non-operative cure of 20 per cent., since, in the first place, but few patients will survive after ten years, and, secondly, the majority of those not traced are probably dead. Of those regarded as inoperable, our records show 26 patients in whom both kidneys were infected. Twenty of these gave a distinct history of infection in the second kidney from two to ten years after the first kidney became diseased. Although we advised twelve of the latter to try tuberculin, all with one exception have since died.

The patients who were operated upon included 14 in whom the symptoms had practically ceased for intervals of several years; in 4 cases as long as ten years and in 1 case twenty years. Cystoscopic examination in these cases demonstrated absence of secretion from one kidney and obliteration of its ureter. This condition is the result of a process which has been called autonephrectomy. It is undoubtedly far more common than is generally believed, and accounts for a large number of so-called spontaneous cures. At operation, the kidney is found to be necrotic and filled with caseous or a semi-solid purulent substance, which had persisted for many years as a menacing source of infection. While a good many sporadic cases of so-called recovery have been reported by various observers, but few of them have been observed long enough— at least ten years—to determine whether or not the recovery is permanent. If spontaneous recovery were as frequent as is claimed by some observers, we should at least occasionally find evidence of healed tuberculous kidneys. But few, if any, of such specimens have been reported. Israel[1] states that tuberculin is of no value whatever in the treatment of renal tuberculosis, and should not be used even in the very earliest stages of the infection. Blum[2] recently reported 26 cases not operated upon, of whom 22 died in from one to three years after observation, many of these, however, were bilateral.

Wildbolz,[3] in the last German Congress of Urology, reported a careful study of 316 cases of renal tuberculosis treated in Switzerland by

various Swiss physicians, by methods other than surgical. His summary is of exceptional value and quite conclusive, since Switzerland is particularly supposed to have climatic conditions favorable for the treatment of tuberculosis, and contains many sanatoria for that purpose. All his patients had careful bacteriological, and many of them had cystoscopic, examinations made. Post-mortem records were available in many. Of this number, he reported that 70 per cent. had died, 60 per cent. in less than five years. Most of them died of complications resulting from infection in the urinary tract. Only 10 per cent. were alive more than five years after the beginning of the disease; in only 5 per cent. had all symptoms ceased over five years; and but one case was positively well in every respect. These observations agree with those made at the Mayo Clinic, and prove quite conclusively that permanent recovery from renal tuberculosis without surgical removal of the diseased kidney is exceptional and not to be relied upon.

It is generally recognized that the results of surgical treatment, while not satisfactory in every case, are followed by cure in the majority. In a recent paper[4] the writer gave the results obtained in 203 cases operated upon at St. Mary's Hospital for renal tuberculosis. The immediate operative mortality (2.9 per cent.) was so low as to be practically disregarded. Those patients (18) operated upon during the current year and those that could not be traced (43) were excluded from the summary of first operative results, leaving but 142 patients, or 70 per cent. of the total number to be considered. Of this number, 116 (82 per cent.) were reported alive more than a year after operation, 98 (69 per cent.) being well or greatly improved, and 18 (13 per cent.) reported little or no improvement in vesical symptoms. A closer analysis of those reported with symptoms unimproved shows that 83 per cent. had a history of infection of more than two years' duration. Of those patients who had symptoms of less than one year's duration, 81 per cent. were well or markedly improved. Furthermore, the convalescence and relief of symptoms of those with recent infections were much earlier than those of long-standing infection. Worthy of note is the fact that 22 per cent. of those reported dead had symptoms of one year or less. It is hardly conceivable, however, that the operation would materially influence the patient's resisting power. The prognosis of patients operated upon in less than a year after the onset of symptoms is, as a rule, much better than those operated upon later.

It has been claimed that the high death-rate during the first year after operation (in our series 61 per cent. of all reported dead) goes to prove that the operation was the cause of death. While it is possible that the operation may in some way lower the already weak resisting powers, it seems more logical to suppose that the patients would have succumbed to the disease even if not operated upon. While it is true that complications outside the urinary tract do not necessarily contraindicate

operation, nevertheless when present the prognosis is rendered less favorable. Evidence of previous complication was found in 19 per cent., and active lesions in 10 per cent. of the patients operated upon. Of those reported dead, 41 per cent. had some evidence of extra-urinary complication at operation. Renal tuberculosis, secondary to pulmonary tuberculosis, was found in but 4 of the cases observed, and all were inoperable. Pulmonary tuberculosis, secondary to renal tuberculosis, was found in 26 patients, most of whom had a renal infection of several years' standing, except 2 who had miliary tuberculosis. Twelve of the patients were operated upon, 6 of whom were reported alive. Of the latter, 3 had but slight involvement and 2 were doubtful. The remaining 14 cases were terminal complications of long-standing renal infection. Tuberculosis of the bones and joints as a complication seemed to have a more favorable prognosis. Spondylitis appears to be exceptional, however, since the 3 patients with spondylitis were reported dead within a year following operation. Marked involvement of the prostate gland renders the prognosis less favorable. Of the 24 males with such involvement, who were operated upon, 11 (46 per cent.) were reported dead. Stricture of the urethra was found in 12 cases; in nine instances it was found in cases considered inoperable. In the 3 patients operated upon, 2 were reported dead within a year after operation. The stricture occurred usually in cases of long-standing infection and recent bilateral complication or in cases of rapid and virulent infection.

The following complications might be considered as the principal contraindications to operation: (1) Advanced pulmonary infection; (2) *multiple* accompanying lesions such as in the joints and bones, prostatic abscess with perineal fistula; (3) peritonitis; (4) marked bilateral involvement; (5) clinical evidence of renal insufficiency. The prognosis of a patient, whose kidney has been removed for tuberculosis, will depend largely upon his resisting power to future tuberculous infection in other parts of his system. It would be unreasonable to suppose that nephrectomy would increase this resisting power other than to remove an active source of infection. Whereas outdoor life, rest, etc. are of little value in the cure of an active renal tuberculosis, it is of considerable value in the prophylaxis of post-operative tuberculous complications. The question has arisen, How soon after the detection of the disease should the kidney be removed? It has been argued that enough time should be given for the normal kidney gradually to hypertrophy. However, experience has shown that a normal kidney can readily perform the function of two when the second kidney is suddenly destroyed. Rather than risk spreading the infection, it would seem that the kidney should be removed as soon as the tuberculous lesion can be ascertained.

Conclusions.

(1) The existence of renal tuberculosis should be suspected in every case of persistent diurnal irritability of the bladder; (2) no such case should be treated without a thorough examination of the urine for the tubercle bacillus; (3) early nephrectomy offers the best chance for cure; (4) the longer the patient's bladder is infected, the slower is its recovery in spite of nephrectomy; (5) with most cases of bilateral infection the second kidney becomes infected some time after the first kidney is diseased, and the infection is evidently transmitted from it; (6) non-operative cure, either spontaneous or through the use of tuberculin, climatotherapy, etc., is exceptional and at best symptomatic; (7) the risk of severe vesical infection and of transmission of the disease to other parts of the body through delay is too great to warrant the small chance for cure by non-operative means.

BIBLIOGRAPHY.

1 Israel (*Zeitschr. fuer Urologie*, Erstes Beiheft, pp. 25-28, 1912).

2 Blum (*Zeitschr. fuer Urologie*, Vol. 3, pp. 238-268, 1909).

3 Wildbolz (*Zeitschr. fuer Urologie*, Erstes Beiheft, pp. 29-74, 1912).

4 Braasch (*Journ. Amer. Med. Assoc.*, February 12th, 1912).

DRUG INFLUENCE ON EXTRASYSTOLES OF THE MAMMALIAN HEART.*

By CAREY P. McCORD, M. D., of Ann Arbor, Mich.

INTRODUCTION.

Not infrequently disorders of the heart are but indications of a general disturbance having a common origin in some other part of the body. The term "functional diseases" is applied to these, whether they arise directly from the automatic mechanism of the heart or from some more peripheral cause. Interesting chapters on "functional diseases" of the heart appear in all the standard systems of medicine and in many monographs on cardiac pathology and treatment.** It is to such works that the reader is referred for the literature on the subject and for a general study of functional diseases of the heart, including extrasystoles—the immediate subject-matter of the present paper. Visceroptosis and pelvic pathology are believed to be capable of producing extrasystoles of the heart. Gastritis, constipation or distention of the stomach may underlie an obstinate cardiac condition. High blood-pressure, dilatation and inflammation of the heart are recognized as sources of stimuli for extrasystoles. The manner in which the heart is stimulated in these cases is not without question. The extrasystoles present in high blood-pressure probably arise from the mechanical stimulation. In extrasystoles, following chronic constipation, evidence would indicate that the absorbed toxic material serves as the stimulus. However, extrasystoles have recently been produced experimentally by the stimulation of the nerve-supply to the heart,† so that the stimuli for extrasystoles, arising from pathological conditions foreign to the heart, may reach the heart reflexly through the nervous system. In all these conditions the heart itself may be excessively irritable.

When the exciting cause for extrasystoles is recognized and is amenable to treatment, the cardiac condition becomes insignificant. In many cases, however, the primary cause cannot be located and remains enigmatic. In others the cause is known, but still is not amenable to treatment. *In just such cases, a decrease in the excitability of the heart through the administration of therapeutic agents would tend*

---

*The experimental part of this paper was carried out in the Research Laboratories of Parke, Davis and Company, Detroit.
**Hirschfelder: Diseases of the Heart and Aorta, p. 892.
  Kelly: Practice of Medicine, p. 419.
  Osler: Modern Medicine, IV, p. 270.
  Allbutt: System, VI.
†Rothberger and Winterberg (*Zentrabl. fuer Physiol.*, Vol. XXV, p. 189, 1911).

to render the heart irresponsive to these stimuli. But no direct experimental evidence has so far been presented, that we possess any drugs which, when administered, are capable of depressing the irritability of the heart and thus of any benefit to extrasystoles. For this reason a series of experiments upon this subject was instituted, the results of which are embodied in the following report.

DESCRIPTION OF METHODS.

The apparatus employed was simple in conception and construction, but thoroughly dependable for the problem at hand, as the control ex-
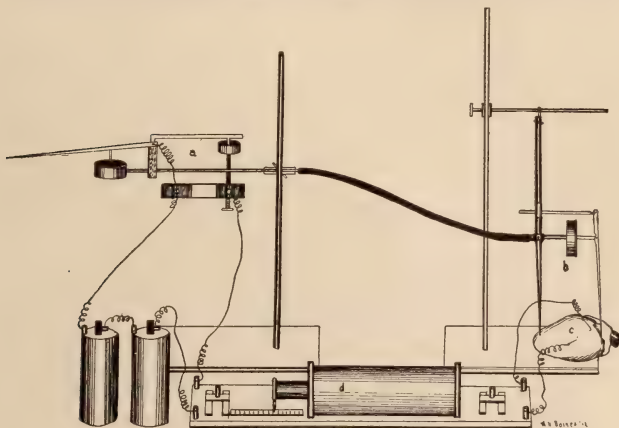
Fig. 1.—Diagram of Apparatus.

(*a*) Extension lever and mercury cup.

(*b*) Cardiograph.

(*c*) Exposed heart with electrodes and cardiograph arms attached. Heart shown in diagram as though removed from animal.

(*d*) Coils and cells.
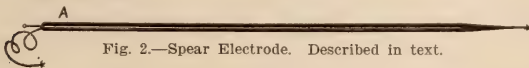
Fig. 2.—Spear Electrode. Described in text.

periments to be described later will indicate. The general plan for the work was to have the heart automatically stimulate itself with single break shocks from an induction coil, thereby producing extrasystoles. The automatic cardiac stimulator used in this work was essentially that of Hirschfelder and Eyster.* Since the end to be attained was different in the two pieces of work, some modifications and adaptations were

---

Amer. Journ. Phys., Vol. XVIII, p. 222.

necessary. The writing lever of a recording tambour was extended backward 5 cm. This extension was of light metal, so as to permit the conduction of the current. To this extension (Fig. 1) was soldered a right angle arm of platinum, which dipped into a mercury chamber below. This mercury cup working on a screw could be raised or lowered depending on the amplitude of the heart, and on the phase of diastole at which the stimulation was to occur. Connections from primary circuit were made with mercury cup and with extension lever. The connection with the extension arm was made at the pivot and was of tinsel-thread, to prevent spring action. From the secondary coil extended fish-hook electrodes which in open-chest experiments were applied directly to the ventricular muscle.

In closed chest experiments, small, straight, barbed spears were substituted for fish-hooks. These were insulated and strengthened by being run through the bore of small wooden tubes forming "spear electrodes" (Fig. 2). These were pushed directly through the chestwall and into the muscle of the left ventricle, and served both for the conveyance of the stimulus and for registration, as will be indicated later. The fall in carotid pressure during the compensatory pause was so great and prompt that it could be taken as the indication of an extrasystole following stimulation. However, direct records of the heart were in all instances also taken. The amplitude record of the heart was traced by the writing lever of the stimulating tambour. This tambour was activated by the heart's contractions recorded through the cardiograph, a modified Marey tambour, the drawing of which makes its mechanism clear without further explanation. In open-chest experiments the two arms of the cardiograph were stitched to the ventricles and recorded the transverse shortening of the heart in systole. The writing lever of the automatic stimulator rose in systole and the extension dipped into the mercury chamber. In diastole the extension lever rose and broke the contact stimulating the heart in any desired portion of diastole depending on the height of the adjustable thumb-screw of the mercury chamber.

Two kinds of recording methods were used in closed chest experiments in which the respiration was natural. In the first, a long sound was introduced through the right jugular vein into the right heart. When properly placed the heart-end of the sound lay against the interventricular septum and against the anterior ventricular wall. The contractions of the heart made a working lever of the sound, the fulcrum being the muscles in the supraclavicular region. The free end was attached to the movable arm of the cardiograph, which activated the stimulating apparatus as before. In these experiments it was necessary to make a small incision on the left side for the application of fish-hook electrodes on the heart. In some cases artificial respiration was temporarily given, in others one lung with its pleura intact was ample for

the short time (three minutes) that the chest was open. After application of electrodes the incision was rendered air-tight, and natural respiration was resumed. In this jugular sound-method the oscillations were fairly constant, but variations in the strength of contraction were not accurately recorded. This fact at first appeared as a disadvantage, but in some respects was an advantage, in that despite changes in amplitude, the heart was stimulated in the same phase of diastole.

Another more accurate method for recording cardiac contractions in closed chest experiments was found in applying the principle of Haycraft.* The spear ends of two spear electrodes, described before, were pushed through the left intercostal spaces and pericardium into the apex and base of the left ventricle. A trustworthy record of the heart's descent in systole was then obtainable by attaching the free end of the base spear electrode to the movable arm of the cardiograph. Tracings of amplitude changes, after administration of such familiar drugs as adrenalin, pituitary extract, barium chloride, were made as a test of the method, and compared exactly with tracings of the same drugs obtained in the more orthodox ways. In these closed chest methods shock was minimized, the vagus tonus was better, hemorrhage was avoided, and air irritation and drying of the heart were prevented.

Reliability and Limitations of Methods.

Control Experiments.—If the heart be thus stimulated each time during the same portion of diastole, allowing thereby for the normal variations in irritability during different phases of diastole, then the strength of the secondary shock, just sufficient to induce an extrasystole, would be a criterion of the irritability of the heart at that time. Thus, increased and decreased irritability, as induced during an experiment, may be expressed in terms of the scale on an induction apparatus. The lowest position of the secondary, just sufficient to produce an extrasystole, will be termed the "minimum stimulus" in this paper, and it should be constantly borne in mind that the irritability and the minimum stimulus bear an inverse relation to each other, *i. e.*, as the minimum stimulus increases, the irritability has decreased. Such an estimate of irritability may only be used with accuracy when we recognize the possibilities of irregularities in the strength of break induction shocks due to the apparatus itself, but fortunately the studies of Martin** allow one so to arrange the apparatus that this source of error is minimized. Accordingly, it may at once be stated that in all work attention was given to the following points. All throw of lever calculating for double sparking was as far as possible eliminated. The mercury surface was kept as clean as possible. The amount of sparking was lowered to a minimum. Break contact stimulations only were used. In experiments involving exposure

---

*Journ. Phys., Vol. XIX, p. 496.
**Amer. Journ. Phys., Vol. XXII, p. 61, et seq.

of the animal's heart, a uniform moisture was maintained avoiding thereby resistance variations. Despite the fact that dry cells vary appreciably, especially when used over long periods, it was found that the primary current was constant enough for this work, provided the dry cells were changed frequently and disconnected, except for the time of actual tests.

In experimental work of this nature some normal variations must be recognized and proper allowance made in estimating results. It was noticed in some experiments that the heart gradually grew more irritable so that in normal animals the minimum stimulus gradually decreased. On account of this variation, experiments indicated that no test could

TABLE I.

Experiment B 12.   July 1, 1911.   Male Dog.   Weight, 14 Kilo.   Open Chest.

Time.	Minimum stimulus causing extrasystole.			Remarks.
3:37	6—;	6.5+;	6.5+	First + indicates lowest position
3:45	5.5—;	6—;	6 5+	of secondary coil causing extra-
3:47	5.5—;	6—;	6.5—	systoles.
3:49	6—;	6.5+;		
3:55	6—;	6.5—;	7+	Heart moistened with salt solu-
4:05	6—;	6.5+;	7+	tion before each test.

Experiment B 77.   Sept. 5, 1911.   Male Dog.   Weight, 11 Kilo.

Time.	Minimum stimulus causing extrasystoles.			Remarks.
3:15	9—;	9.5+		
3:17	9—;	9.5+		
3:24	9—;	9.5+		
3:29	9.5—;	10+		
3:33	9.5—;	10+		
3:38	9.5—;	10+		
3:44	9.5—;	10+		New battery.
3:55	6.5—;	7+		
4:05	6.5—;	7—;	7.5+	
4:08	6.5—;	7+		
4:13	6.5 -;	7+		
4:18	7—;	7.5+		
4:21	7—;	7.5+		

be recognized unless the increase or decrease was at least 1.5 cm. difference in position of secondary coil above or below the minimum stimulus. In all tests sufficient time-interval was allowed between stimulations to prevent any change in irritability due to previous stimulation. The most critical test for the apparatus was that it was sensitive to the irritability changes during the different portions of diastole.

Changes of Irritability During an Experiment.—The two experiments tabulated below, carried out on normal animals, indicate the slight variations in the strength of secondary current sufficient to induce an extrasystole. In each test the heart was first tested with subminimal stimuli. Gradually the coil was moved toward the primary, until the

"minimal stimulus" causing an extrasystole was found. After this the coil was moved back and the test repeated to make sure that the true "minimum stimulus" had been found. In all tabulations the first plus sign in each set of figures indicates the lowest position of the secondary coil sufficient to produce an extrasystole. The minus signs indicate at what positions of the secondary no extracontractions were elicited. In the second experiment the marked difference in the upper and lower portions was occasioned by a change of batteries as indicated in Table I.

Influence of Blood-Pressure on Irritability.—High blood-pressure has long been looked upon as a prolific cause of extrasystoles. As the blood-pressure varied during an experiment, it was determined to carry out a short series of experiments in which the aorta was clamped in its descending thoracic portion. This occasioned a very high pressure and spontaneous extrasystoles. The irritability was measured (1) before the compression of the aorta, (2) during the period of high pressure, and (3) after releasing the aorta. In every case the irritability was higher at the time of high pressure. The extrasystoles present at the time of high pressure disappeared on the releasing of the aorta. Any pressure-lowering drug also caused the disappearance of extrasystoles, only to reappear as the pressure resumed its former height.

Influence of Miscellaneous Agents.—No commensurable difference in the heart's irritability was noted in the change from natural to artificial respiration or vice versa. Hemorrhage, except in the extreme last stage just before death, caused no variations in irritability. Just before death from hemorrhage, the irritability became increased. Removal of the vagus influence, through section of both nerves, in all cases increased the irritability, but never beyond the limit of normal variation. Atropine in 1/60 gr. doses caused the same increase in irritability through paralysis of the vagus endings. This increase was constant but never more than 1 cm. difference in position of the secondary coil.

With these limitations in mind and guarded against, a study of drug influence on irritability was carried out, and the results are recorded in the next division of this paper.

ACTION OF DRUGS.

Although the general trend of treatment for functional heart diseases is more toward hygienics than drug therapy, still the total number of drugs, that find favor with reputable therapeutists in their treatment of this condition, constitutes a large list. The action of none of these has been worked out with precision, but are prescribed purely empirically. It is from this class that drugs were selected for study, hoping to put their somewhat obscure beneficial action on a more rational basis. To this list there were added those drugs that have been found to affect the irritability of the heart of cold-blooded animals.[*]

[*]Schultz (*Amer. Journ. Phys.*, Vol. XXII, p. 133).

TABLE II.

Position of Secondary Coil as a Measure of

	Irritability before compression. I.	Irritability during compression. II.	Irritability after releasing aorta. III.	Difference in irritability between I and II.	Remarks.
Experiment Aug. 12.	B. 58.	Dog, 12 Kilo.			
		Closed Chest.			
Aorta clamped..........	16—; 16.5—; 17.5+	12—; 13+		4.5	New battery.
Aorta occluded..........	12.5—; 13+	11.5—; 12+; 13+	13—; 15—; 16+	1	
Aorta released..........		12.5—; 13+		3	
Aorta clamped and released..	9—; 9.5—; 10+	6—; 7+; 9+	7.5—; 8+	3	
Aorta clamped..........		7.5—; 8+	11.5—; 12+	4	
1/50 gr. Nitroglycerin..........					
Experiment Aug. 14.	B. 59.	Male Dog.			
		15 Kilo.			
Aorta clamped and released...	10—;	9.5—;	10—; 10.5+	.5	
Aorta clamped and released...	10.5+	8—;	10—; 11—; 12+	1.5	
Experiment Aug. 15.	B. 60.	Male Dog.			
		15 Kilo.			
Aorta clamped..........	10—; 11—; 12+	6—; 7+; 10+	12—; 12.5—; 13+	5	
Aorta released..........		11—; 12+		1	
Experiment Aug. 17.	B. 61.				
Aorta clamped and released ...	10—; 11—; 11.5+	9.5—;	10—; 11—; 11.5	1.5	
		10+			
Experiment Aug. 19.	Male Dog.	12 Kilo.			
Aorta clamped and released...	9.5—; 10+	6—; 7+	9—; 10+	3	
Aorta clamped..........	9.5—; 10+	6—; 7+		3	

In this series of experiments it was found that many animals were very much more susceptible than others. The irritability could not be influenced at all in some few cases. Consequently no drugs were ab· solubly constant. And further, it was noted that in the open-chest experiments, the exposure of the heart, with its concomitant deleterious influences, rendered the heart much less sensitive to drug influences, and would thereby vitiate results unless proper consideration were given this point. With this in mind the drugs investigated may be placed in three classes, according as their action is pronounced and constant (Class I), slight and uncertain (Class II), entirely absent (Class III).

Class I.—Action pronounced and constant. The most nearly constant results were obtained from the salts of potassium and barium, and from chloretone.

TABLE III.

Potassium Iodide.

No. and Date.	Amount.	Administered.	Minimum Stimulus before drug.	Minimum Stimulus during drug action.	Remarks.
B50 8/3	1 c.cm. 20%	Intravenous	7—; 7.5—; 8+	8—; 10—; 12—; 13+	First + indicates lowest position of secondary coil causing extrasystole.
B52 8/5	1 c.cm. 20%	Intravenous	8.5—; 9+	19—; 20—	
B53 8/7	1 c.cm. 20%	Intravenous	9—; 9.5—; 10+	10—; 10.5—; 11+	
B53 8/7	1 c.cm. 20%	Intravenous	8—; 8.5+	8.5—; 9+	
B53 8/7	½ c.cm. 20%	Intravenous	8—; 9+	12.5—; 13+	
B55 8/9	3 c.cm. 20%	Deep Muscle	13—; 14+	15—; 17+	
B56 8/10	3 c.cm. 25%	Deep Muscle	11—; 11.5+	10—; 11.5+	
B56 8/10	3 c.cm. 20%	Stomach	11—; 11.5+	11—; 11.5+	
B57 8/11	¾ c.cm. 10%	Intravenous	5.5+; 6+	6—; 6.5—; 7.5+	
B60 8/15	¾ c.cm. 10%	Intravenous	6—; 7+; 8+	10—; 11—; 12+	
B68 8/15	1 c.cm. 10%	Intravenous	12.5—; 13+	12—; 15—; 17—; 17.5+	
B69 8/27	1 c.cm. 10%	Intravenous	9.5—; 10+	10—; 11—; 11.5+	
B70 8/27	1 c.cm. 10%	Intravenous	6—; 6.5—; 7+	8—; 8.5+	
B70 8/27	1 c.cm. 10%	Intravenous	8.5—; 9+	10—; 11—; 12+	
B71 8/29	½ c.cm. 1%	Intravenous	8—; 8.5+	7.5—; 8.5+	
B71 8/29	1 c.cm. 1%	Intravenous	6—; 7+	6—; 9+	
B72 8/30	½ c.cm. 4%	Intravenous	6.5—; 7+	7—; 8—; 8.5+	
B72 8/30	1 c.cm. 4%	Intravenous	7—; 7.5+	7—; 8—; 8.5+	
B73 8/31	1 c.cm. 4%	Intravenous	6—; 6.5+	6.5—; 7+	
B74 9/1	1 c.cm. 4%	Intravenous	10—; 10.5—; 11+	10—; 12—; 12.5+	

TABLE III—Continued.
Barium Chloride.

No. and Date.	Amount.	Administered.	Minimum Stimulus before drug.	Minimum Stimulus during drug action.	Remarks
B17. 7/12	2.5 c.cm. 1%		7—; 7.5+	8.5—; 9+	
B19. 7/15	2 c.cm. 1%		4—; 5+	7—; 8—; 8.5+	
B21. 7/16	2 c.cm. 1%		5.5—; 6+	6—; 6.5—; 7+	
B22. 7/17	1.5 c.cm. 1%		8.5—; 9+	9—; 9.5+	
B26. 7/20	1 c.cm. 1%		4.5—; 5+	8—; 12—; 14—; 20—	
B30. 7/22	1 c.cm. 1%		10.5—; 11+	12—; 15—; 17—; 18+	
B50. 8/3	1 c.cm. 1/10%		12—; 12.5+	13—; 15—; 16—; 17+	
B50. 8/3	1 c.cm. 1/100%	Intravenous.	11.5—; 12+	11.5—; 12+	Typical action of barium on heart and blood pressure.
B53. 8/7	3 c.cm. 1%		8.5—; 9+	9—; 10—; 11+	
B69. 8/25	1 c.cm. 1%		9—; 9.5—; 10+	10—; 12—; 13+	
B71. 8/29	1 c.cm. 1%		5.5—; 6+	6—; 8—; 9+	
B72. 8/30	1 c.cm. 4%		7—; 7.5+	7—; 8—; 9—; 10+	
B73. 8/30	2 c.cm. 4%		3—; 4+	4—; 4.5+	
B78. 9/6	2 c.cm. 4%		4.5—; 5+	5—; 6+	
B83. 9/11	2 c.cm.		6—; 7+	7—; 8—; 9—; 9.5+	
B83. 9/11	2 c.cm.		5—; 5.5+	6—; 8—; 10—; 12+	
B84. 9/12	2 c.cm.		9—; 10+	10—; 11+	
B85. 9/14	2 c.cm.		8—; 8.5—; 9+	10—; 11—; 11.5+	

Chloretone.

No. and Date.	Amount.	Administered.	Minimum Stimulus causing extra systole before drug.	Minimum Stimulus causing extra systole during drug action.	Remarks.
B94 9/22	2 gr.	Intravenous	13.5—; 14+	14—; 15—; 16—; 16.5+	Closed chest. Dissolved in defibrinated blood.
B95 9/22	2 gr.	Intravenous	13.5—; 14+	14—; 15—; 16+	"
B95 9/22	2 gr.	Intravenous	13—; 15.5+	13—; 14—; 15—; 16+	"
B96 9/23	2 gr.	Intravenous	12.5—; 13+	13—; 13.5—; 14+	"
B99 9/27	2 gr.	Intravenous	10.5—; 11+	11—; 12—; 13—; 14+	"
B101 9/29	2 gr.	Intravenous	12—; 12.5+	13—; 14+	"
B101 9/29	10 gr.	Stomach	11—; 11.5+	12.5—; 13+	Dissolved in alcohol.
B105 10/3	2 gr.	Intravenous	14—; 15+	15—; 17—; 18+	Dissolved in blood.
B105 10/3	2 gr.	Intravenous	13—; 13.5+	14—; 15—; 15.5+	"
B107 10/5	2 gr.	Intravenous	5.5—; 6+	8—; 8.5+	Dissolved in alcohol.
B108 10/6	2 gr.	Intravenous	8—; 8.5+	8.5—; 9+	Dissolved in blood.
B108 10/6	2 gr.	Intravenous	8—; 8.5+	8.5—; 9+	"

Discussion of Results.—From these tables it appears that on the administration of potassium iodide, barium chloride, or chloretone, the heart is rendered much less susceptible to electrical stimuli, so that a

decidedly stronger current is required to induce extrasystoles. That is, the heart's irritability is depressed. Of these three drugs, barium chloride augments the heart, chloretone depresses, and potassium iodide has little or no action on the dosage employed, and yet, different as they act upon the amplitude of the heart, they all depress the heart's irritability. Therefore the term "depression of the heart" in itself means little unless qualified in some such way as to mean depression of irritability or depression of contractibility, etc. Further, as seen in the case of potassium iodide, it is quite possible to alter one of the fundamental functions of the heart without any disturbance of the others. And in the case of barium, an inotropic influence is exerted in a positive way, while a bathmotropic influence is exerted in a negative way.

Class II.—Action slight or uncertain. In a second group fall a number of drugs, whose excitability-lowering-action on the heart was either so small or so inconstant as not to be trustworthy. It was found in some susceptible animals that strychnine sulphate had a pronounced action in lowering the irritability. In the majority of cases, however, it was without influence. (See table.) The calcium salts almost constantly lowered the excitability, but to a very slight degree. Chloral hydrate in favorable experiments decreased the excitability, but owing to the marked depression of the heart the automatic stimulation was interfered with, so that these results have been disregarded. As was stated in an earlier portion of this paper, nitroglycerin decreased the irritability, but this action was not through any action on the heart, but through the lowering of the blood-pressure.

TABLE IV.

Strychnine Sulphate.

No. and Date.	Amount.	Administered.	Position of coil for minimum stimulus before administration of drug.	Position of coil for minimum stimulus during drug action.	Remarks.
B30. 7/21	1/30 gr.		11.5—; 12+	12—; 13+	
B50. 8/3	1/30 gr.		12—; 12.5+	13—; 13.5—; 14+	
B50. 8/3	1/30 gr.		10.5—; 11+	10.5—; 11+	
B53. 8/7	1/30 gr.		8—; 9+	10.5—; 11+	
B53. 8/7	1/30 gr.		8.5—; 9+	11—; 11.5+	
B55. 8/9	1/30 gr.		4—; 4.5+ 5+	7—; 8—; 9+	
B56. 8/10	1/30 gr.	Intravenous.	10.5—; 11+	10.5—; 11+	The first + indicates position of secondary coil giving an extrasystole.
B70. 8/27	1/30 gr.		8.5—; 9+	8—; 8.5+	
B71. 8/29	1/30 gr.		5.5—; 6+	6—; 5.5+	
B72. 8/30	1/30 gr.		7—; 7.5+	6.5—; 7+	
B79. 9/7	1/30 gr.		8.5—; 9+	11—; 12—	
B81. 9/9	1/30 gr.		6.5—; 7+	7—; 7.5—; 8+	
B83. 9/11	1/30 gr.		6—; 6.5+	6.5—; 7+	
B84. 9/12	1/30 gr.		7.5—; 8+	7.5—; 8+	
B92. 9/22	1/30 gr.		8—; 8.5+	8.5—; 9+	
B93. 9/23	1/15 gr.		12.5—; 13+	13—; 13.5+	

Class III.—Action entirely absent. A third group of drugs is made up of those which were uniformly without action in decreasing the irritability. Atropine was found to have a slight action in increasing the excitability. This is true in the same minor degree for preparations of digitalis. Apparently none of the therapeutic value of digitalis is derived from decreasing the heart's excitability. Adrenalin and pituitary extracts have no effect except when used in such large amounts as to cause a very high pressure. This is of interest as showing that a drug may increase (adrenalin) or decrease (pituitary extracts) contraction and yet leave the irritability entirely unmodified. Morphine, cocaine, copper salts, ergotoxine and strontium were all without influence upon the excitability of the heart, in as far as we were able to detect with our apparatus in a limited number of injections of each drug.

Summary.

1. Results favor Engleman's theory that one function of the heart may be modified without a corresponding modification of the others. Thus (a) potassium iodide depresses irritability, no effect on the contraction;

(b) barium chloride depresses irritability, increases the contraction;

(c) chloretone depresses irritability, decreases the contraction;

(d) adrenalin, no change in irritability. Increases the contraction;

(e) pituitary, no change in irritability. Decreases the contraction.

2. Potassium iodide, barium chloride and chloretone, all depress the excitability of the heart. It must be borne in mind, however, that in the present stage this is of pharmacological rather than of therapeutic interest, for barium salts are contraindicated for any practical use on account of their poisonous nature, and the action from potassium iodide is not observed on administration *per os*.

3. In high pressure the irritability of the heart is much increased. Therefore, pressure-lowering drugs are serviceable in abolishing extrasystoles in high blood-pressure cases.

1328 Washtenaw Ave.

MEDICAL AND SURGICAL PROGRESS.

HEXAMETHYLENAMIN—ITS USE IN DISEASES OF THE UPPER RESPIRATORY TRACT.

A REVIEW OF RECENT LITERATURE.

By WM. B. CHAMBERLIN, M. D., of the Editorial Staff.

1. Armstrong and Goodman: The Excretion of Salicylic Acid and Hexamethylenamin in the Sputum. (*Journ. Amer. Med. Assoc.*, p. 1553, May 27th, 1911.)
2. Barton: The Elimination of Hexamethylenamin by the Mucous Membrane of the Middle Ear. (*Journ. Amer. Med. Assoc.*, p. 871, March 12th, 1912.)
3. Crowe: The Excretion of Hexamethylenamin in the Bile and Pancreatic Juice. (*Bulletin Johns Hopkins Hospital,* Vol. XIX, p. 108, 1908.)
4. Crowe: The Excretion of Hexamethylenamin in the Cerebrospinal Fluid. (*Bulletin Johns Hopkins Hospital,* Vol. XX, p. 102.)
5. Eisenberg: The Use of Hexamethylenamin in the Affections of the Upper Respiratory Tract. (*Journ. Amer. Med. Assoc.*, No. 26, June 29th, 1912.)
6. Frothingham: The Effect of Hexamethylenamin on Guinea-pigs. (*Arch. Int. Med.*, Vol. IV, p. 510, 1909.)
7. Heitmueller: The Excretion of Hexamethylenamin. (*Journ. Amer. Med. Assoc.*, p. 1222, April 9th, 1910.)
8. Hamilton (*Australasian Medical Gazette,* May, 1911).
9. Hanzlik: Excretion of Hexamethylenamin in the Saliva. (*Journ. Amer. Med. Assoc.*, p. 1940, June 11th, 1910.)
10. Miller: Hexamethylenamin—A Remedy for Common Colds. (*Journ. Amer. Med. Assoc.*, p. 1718, June 10th, 1911.)
11. New and Non-Official Remedies—Hexamethylenamin in U. S. P. (*Journ. Amer. Med. Assoc.*, p. 1195, April 20th, 1912.)
12. Sollman: Formaldehyde Derivatives. Their Fate and Action in the Body. (*Journ. Amer. Med. Assoc.*, p. 818, September 5th, 1908.)
13. Zak: New Uses of Hexamethylene Tetramine Based on its Channels of Elimination. (*Wien. klin. Wochenschr.*, p. 151, January 25th, 1912.)

Hexamethylenamin, known under the trade names of urotropin, formin, aminoform, hexamin, cystamin, cystogen, etc., was first used by Prof. Nicolaier in 1894 or 1895, though its discovery dates back many years earlier, 1860-1865 according to some authors. "It is produced by the

action of ammonia on formaldehyde, and occurs as colorless crystals which are without odor, and in watery solutions gives a slightly alkaline reaction. It is very soluble in water, less than two parts, and quite soluble in alcohol, about ten parts."

Nicolaier first used it as a urinary antiseptic in diseases of the kidney and bladder. As such it is probably our best known and most reliable remedy to-day. As a solvent of uric acid calculi, however, it has not been successful. The earlier and more restricted use of hexamethylenamin has of late been greatly extended, largely as a result of painstaking research in regard to its fate in the body and its subsequent excretion. "Although excretion is largely through the urine, it has been found in the blood, in the gall-bladder, in the pancreatic juice, in the middle ear, in the serous fluid of the cerebrospinal axis, and it has lately been shown that it is probably excreted into the various mucous membrane sinuses or cavities associated with the nose and throat. It has been shown that it is excreted into the synovial fluid of the joints and into the sputum of patients suffering from bronchitis, pneumonia, pulmonary tuberculosis, and even asthma." The antiseptic properties of the drug are generally conceded to be due to its being easily broken up in the tissues, with the resulting liberation of free formaldehyde.

Literature on the use of hexamethylenamin in the upper air-passages is at present rather scanty, but enough has been written from careful observation to show that here too it has a decidedly beneficial action, and to suggest its use more frequently in such affections. Its use in acute and chronic sinus affections is in most cases but briefly alluded to, but more extended reports are given in regard to bronchial and pulmonary conditions.

The usual dose is 7 1/2 gr., three or four times daily, but 75 gr. per day have been given with no untoward results. Individuals seem capable often of withstanding enormous doses without the appearance of toxic symptoms, while Frothingham mentions the administration to a guinea-pig of "375 gr. in eight doses during nine days." Toxic symptoms are those of "gastric irritation, some abdominal pain, some pain in the back denoting kidney congestion, excessive irritability of the bladder with strangury, and possibly some hematuria or hemoglobinuria. There may also be, from the intestinal irritation, an eruption of the skin, urticarial in character." In those who seem to possess special indiosyncrasy, gastric irritation is readily caused, and albumin, casts, and a small amount of blood may appear in the urine. "In ordinary cases, however, hexamethylenamin will rarely cause an albuminuria unless some involvement of the kidneys is already present."

The most recent report of its use in affections of the upper air-passages is that of Eisenberg, who used it in a total of 43 cases with exceedingly gratifying results. His opportunities for careful observation seem to have been exceptionally favorable with children and employes in the Lower Brule Indian School; so that the report deserves careful consideration and warrants the further use and observation of the drug in this class of cases. Of the 43 cases treated, 22 were of acute bronchitis, 12 acute rhinitis, 8 influenza of the respiratory type, and 1 chronic frontal sinusitis. Eisenberg's dosage of the drug seems to be somewhat less than that usually employed, and is given as follows. In acute rhinitis 4 gr. three times daily in half a glass of water for children up to ten years, twice daily for the following day or so. For children up to fifteen years, the dosage is 6 gr. and for adults 10 gr., given in the same manner. In acute bronchitis the patients were

kept in bed while the temperature was above normal, and 10 gr. of hexamethylenamin were given three times daily for three days, then twice daily until the subsidence of cough. All were well in four to five days. Children were given correspondingly smaller doses. In influenza the patients were, of course, placed in bed during elevation of temperature, and 10 gr. were administered three times daily until the temperature was below 100° F., then half doses three times daily until the temperature became normal. With accessory sinus disease his experience is limited to one case where it seems to have exerted a favorable action. Eisenberg's conclusions are as follow. "(1) Hexamethylenamin is a valuable remedy in the treatment of inflammatory conditions of the upper respiratory tract. (2) It must be given in doses large enough to secure its full physiological effect. (3) No untoward symptoms were observed while given in fairly large doses (up to 30 gr. daily). (4) It seems to prevent possible complications of acute rhinitis, such as bronchitis and sinusitis."

Vanderhoff mentions a daily dose of 15-25 gr., and adds that 75 gr. daily have been administered without untoward results. His daily dose was 10 gr. four times to adults. Occasionally in susceptible patients hematuria and pain on urination may be noticed, also a skin rash not unlike measles. His "experience with hexamethylenamin in the treatment of acute colds and acute and chronic bronchitis has been most gratifying. In the case of individuals subject to severe colds, the stage of acute coryza has been definitely lessened in length, and in practically all cases the succeeding stage of acute bronchitis has been slight or missed entirely." He reports the successful use in "2 antrum cases which had resisted several surgical procedures." Vanderhoff considers it "our best remedy in acute bronchitis. It is also of value in certain cases of chronic bronchitis, while on others it does not seem to have any effect."

Miller observed that "in most cases of common colds it acts promptly and effectively. The irritating, watery secretion of coryza stops, the fever, aching and malaise of influenza cease, the threatening disease is averted. As a cure for colds it may be as great a boon as it has been proved to be as a urinary antiseptic." In Heitmueller's case of chronic bronchitis, "after three doses the character of the expectoration changed from mucopurulent to mucoid, and after six doses the quantity was very much diminished." Portions of the sputum tested after the third and sixth doses gave positive reactions for formaldehyde.

Armstrong and Goodman made a careful examination of the sputum after administration of hexamethylenamin in 12 cases. In each the dosage was 25 gr. daily, and in each case the tests were positive. Among these were 9 cases of pulmonary tuberculosis, 1 pneumonia, 1 broncitis, and 1 asthma. The technique is as follows: "The twenty-four-hour amount of sputum was put in an Erlenmeyer flask, diluted with water, acidified with sulphuric acid and distilled, the distillate being collected in water in a cooled Erlenmeyer flask. The distillate was then tested for hexamethylenamin by adding to it 4-6 drops of milk, three drops of a 3 per cent. ferric chloride solution and stratifying the mixture after agitation on concentrated sulphuric acid. At the point of contact an amethyst color is observed.".

Practically all writers insist upon the drug being always given dissolved in half a glass of water, never alone, and the drinking of copious draughts of water during its administration. They also insist on the giving of large doses, though the amount given seems to vary from 25 to 40 gr. daily.

THE MIDWIFE IN THE UNITED STATES.

A REVIEW OF RECENT LITERATURE.

By Hugo Ehrenfest, M. D., of the Editorial Staff.

1. Allport: The Relation of the Midwife to the Community. (*Chicago Medical Recorder*, p. 123, March, 1912.)
2. Baker: Schools for Midwives. (*Amer. Journ. Obstet.*, p. 256, February, 1912.)
3. Darlington: Present Status of the Midwife. (*Amer. Journ. Obstet.*, p. 870, May, 1911.)
4. Davis: Modern Obstetrics, With Relation to the General Practitioner, the Student, the Midwife and the Specialist. (*Amer. Journ. Obstet.*, p. 21, July, 1912.)
5. Edgar: The Remedy for the Midwife Problem. (*Amer. Journ. Obstet.*, p. 881, May, 1911.)
6. Emmons and Huntington: The Midwife. (*Amer. Journ. Obstet.*, p. 393, March, 1912.)
7. Holmes: Midwives of Chicago. (*Journ. Amer. Med. Assoc.*, p. 1346, April 24th, 1908.)
8. Hedger: Midwives and Blindness. (*Illinois Med. Journ.*, p. 419, April, 1912.)
9. Huntington: The Regulation of Midwifery. (*Boston Med. and Surg. Journ.*, p. 84, July 18th, 1912.)
10. Lobenstine: The Influence of the Midwife on Infant and Maternal Mortality and Morbidity. (*Amer. Journ. Obstet.*, p. 876, May, 1911.)
11. Mabbot: Regulations of Midwives in New York City. (*Amer. Journ. Obstet.*, p. 516, April, 1907.)
12. Newmayer: Midwives in Philadelphia. (*Journ. Amer. Med. Assoc.*, p. 60, January 6th, 1912.)
13. Sherwood: Midwives in Baltimore. (*Journ. Amer. Med. Assoc.*, p. 2009, June 19th, 1909.)
14. Studdiford: Attempts at Regulation of Midwife Practice. (*Amer. Journ. Obstet.*, p. 898, May, 1911.)
15. Wile: Schools for Midwives. (*Medical Record*, p. 517, March 16th, 1912.)
16. Williams: Medical Education and the Midwife Problem. (*Journ. Amer. Med. Assoc.*, p. 1, January 6th, 1912.)

Systematic investigations of existing conditions in New York (11), Baltimore (13), and Chicago (7), and general discussions of the question of midwifery by societies such as the American Association for the Study and Prevention of Infant Mortality, the New York Association for the Blind, Conference on Infant Hygiene held in Philadelphia, May, 1912 (9), etc., have brought out the following three incontrovertible facts concerning the midwife situation in the United States: (1) A large

percentage of all births in this country are attended by a midwife, and this conservatively estimated is approximately 50 per cent.; (2) the overwhelming majority of her clientele is represented by the foreign population including the negro; (3) the average midwife practising in this country is an untrained, ignorant and incompetent woman.

As stated, in the opinion of practically all writers on the subject, these three facts must be regarded as positively established.

Various communities show wide differences in the participation of the midwife in obstetric practice. That an estimate of 50 per cent., based only on birth reports, is probably below the actual figure may be deduced from the fact that, for example, in Boston, in 1911, according to Huntington (9), not a single birth was reported to the City Registrar by a midwife, which certainly does not mean that there are no midwives in Boston, or that no birth was attended by a midwife. "They do exist, but are closely connected with physicians who report the birth for them." Some improvement in this situation is expected from the Prompt Birth Return Law just passed in Massachusetts, which requires the reporting physician or midwife to state whether or not he or she was actually present at birth.

The second evident fact, that the midwife at least in her legitimate obstetric work is almost entirely dependent upon the ignorant immigrant and negro, will help more than any other in the final solution of the vexed problem of eliminating the truly dangerous type of midwife. The writer will come back to this point.

In describing the present-day midwives most authors use a wealth of adjectives, none very complimentary. To quote only Darlington (3): "Midwifery investigations prove conclusively that the midwife with very few exceptions is dirty, ignorant and totally unfit to discharge the duties which she assumes." Those who find at least something good in the midwife are few. Allport (1) refers to the interesting and rather amusing fact that not so very long ago a similar war of extermination was waged against the man-midwife, the descriptive adjectives applied to him being about the same as found to-day in the writings against the woman-midwife. "Beware of the man-midwife; regard him as the most subtle and venomous reptile that crawls upon the earth." Only in 1858 Sir Anthony Carlisle, late president of the Royal College of Surgeons, in a letter to the *London Times*, raised a vigorous protest against the proposed spread of man-midwifery through extension of the examining and licensing powers of the Royal College of Surgeons. Allport states: "The assumption that we are afflicted with a plague of bad midwives is correct, but the fault lies with us as a community and not with the midwives, who, like the rest of humanity, are just as good or as bad as our laws or our enforcement-mechanism obliges or allows them to be." Lobenstine (10) acknowledges the deplorable state of affairs, but feels that we must admit that the majority of women under the care of midwives pass through their hands without serious danger.

Possibly the most flattering statement made by some writers concerning the midwife is to the effect that she is just as good as the average low-priced practitioner in this country. "If we look at the obstetrics as conducted in the foreign quarters," Huntington writes, "we are at once brought face to face with two classes of practitioners, the midwife, usually dirty and untrained, and her competitor or accomplice, the doctor, usually ignorant and often unscrupulous."

While thus a consensus of opinion is evident concerning the fact that a thoroughly incompetent type of midwife is to-day doing a very large amount of obstetric work among our foreign population, discussion is open still concerning a few other charges commonly made against the midwife. She is accused of being responsible to a very large extent for puerperal infections, for a high infant mortality, for blindness due to ophthalmia neonatorum, and for the abortion evil.

Accurate and reliable statistics are wanting in this country. According to Huntington: "Recent figures of Chalmers in Glasgow where the physicians are good, the midwives poorly trained, show that puerperal fever was occurring in the practice of midwives twice as often as in the practice of qualified practitioners. In this country it usually has been proved that in this regard midwives are not worse than physicians. This has been used as an argument in favor of the midwife, but probably proves nothing else than that in this country obstetric practice has been allowed to sink to a frightfully low level." Lobenstine (10), in his professional connection with the large New York Lying-in Hospital, certainly has gained extensive personal acquaintance with existing conditions, and one must agree with him when he claims that the poorly trained physician does far more harm than the midwife. This undoubtedly is true in relation to puerperal infection in view of the right—indeed, pronounced—tendency of this type of practitioner to perform difficult and often uncalled for obstetric operations in most unfavorable surroundings. There possibly is very little difference in the rôle which midwife and poorly trained practitioner play in the avoidable loss of infant life during birth. The general morbidity among infants under the care of midwives is not specially high.

The undeniable responsibility of the midwife for avoidable blindness caused by ophthalmo-blenorrhea has been pointed out by Hedger (8) and especially by Miss Van Blarcom, the Executive Secretary of the Committee on Prevention of Blindness of the New York Association for the Blind. She studied carefully the effect of the regulation of midwives under the new law in England. She, like all other investigators of this particular problem, comes to the conclusion that an improvement in the appalling conditions can be expected only by a better training and supervision of midwives.

Then finally there is the most serious of the indictments generally made against the midwife—her participation and responsibility in the matter of criminal abortion. An interesting investigation into the relation of the French midwife to abortion has recently been made by Dr. Bertillon, of Paris. He found that fifty midwives advertised continually in Paris papers. By computing exactly the advertising expenses, he discovered that one of them spends $2665.00 annually, another $1611.00, nearly twenty of them an average from $400.00 to $1000.00, and the thirty others an average from $200.00 to $400.00 annually. These sums indicate that it is impossible that these midwives should practice their profession ethically and legally. He suggests that the report of every miscarriage should be made obligatory. In this country the advertisements of midwives can be regularly found in almost all daily papers. Certain glaring abuses in this respect, from time to time, have been stopped by the postal authorities, and only very few of our dailies exclude those advertisements on account of their undeniable viciousness. Lobenstine states that midwives are said to be responsible in this country for about one-third of all criminal abortions. The writer himself be-

lieves that another third is performed by physicians, and the last third by the patients themselves. In his opinion, in this country, as many, if not more, abortions are performed by physicians as by midwives, and this certainly is true for the better class of people among whom artificial abortion proportionately is more common and "more criminal," if such a term can be used. The writer has been told by detectives, assigned to the Health Department of one of the large cities of this country, that they have succeeded fairly well in stopping the nefarious business of some of the most notorious criminal midwives of that city. They feel sure, however, that this has not resulted in any reduction of abortions, but only has increased the business of the criminal physicians.

We may then conclude that as far as puerperal infection, avoidable loss of infant life during birth, and criminal abortion are concerned, the average midwife is not markedly worse or better than the average physician practising among the same class of people. Her acknowledged larger responsibility for avoidable blindness due to ophthalmia could easily be obviated by a stricter enforcement of a law which exists in many states, compelling the midwife to report promptly all cases of sore eyes in new-born babies.

It seems obvious that we have to get rid of the incompetent midwife as well as of the incompetent practitioner.

What have we done, what can we do to relieve this shameful situation? "The United States of America," writes Darlington (3), the Health Commissioner of New York City, "probably is the only civilized country in the world in which the health, as well as the life and future well-being of mothers and infants, is not safeguarded as far as possible through the training and control of midwives. Excepting in a very few localities in this country any woman may follow the profession of midwifery, unsupervised and unrestricted. In thirty-three of the forty-eight states and territories there is no law restraining the practice of midwifery; in two, Georgia and Alabama, midwives are actually allowed by law to practise unrestricted." Or as Davis (4) expresses the same fact: "The European midwife is trained in hospital schools maintained by the government, is taught under regulations prepared by the best authorities in her country, and is practising under a license which is revoked whenever she does not obey strict rules. There is throughout her country one uniform method of medical control. Conditions in the United States are quite different. But little instruction is given to midwives. Their licenses are municipal and are used in that same careless manner in which much of our municipal work is done. They are under no direct supervision. It is my belief that they are a menace to the health of the community, an unnecessary evil and a nuisance. If the midwife is indispensable, then she should be educated and supervised as in Europe, which, however, is impossible without a national board of health and a secretary of hygiene." It may be stated in this connection that the midwife has been controlled, for example, in France since 1803, in Austria, Norway and Sweden since 1810, in Belgium since 1818, and in England since 1903.

"At the present time ignoring the midwife," Baker (20) writes, "is criminal culpability, but denying her existence is a state of sublime ignorance that bears the element of humor, but is essentially tragic in its consequences." Simply to ignore the midwife, however, is vigorously advocated by a large group of physicians who think that the easiest solution of the midwife problem would be her complete elimina-

tion; a process which would be greatly impeded by giving her at this time a certain standing through official recognition of her existence.

Absolute suppression, a thorough training followed by proper supervision, and an educational propaganda among those who employ midwives are the three chief remedies recommended by most authors. Without any intention of offending the midwife, the writer would like to call attention to the noteworthy fact that these three proposed remedies show the close resemblance of the midwifery problem to the prostitution problem. He considers this point worth mentioning, because certain principles evolved in the attempt to abolish or control prostitution, with slight modifications, can be applied to the endeavor of regulating midwifery.

In spite of the insistence of a group of physicians that even at the present day the midwife is entirely superfluous, it seems to be the general consensus of opinion, among social workers and health officers, that the midwife cannot be eliminated at once. Our foreign population, through generations, has been accustomed to employ her, and nothing is harder to abolish than a deeply rooted custom. But of still greater moment is an important economic question involved in this problem. The midwife supplies both medical attention and nursing, and often helps in the care of the household. As Darlington says: "The demand for the midwife exists and will continue for traditional and economic reasons; the midwife's existence may be ignored, but she cannot be eliminated." The economic side of the problem is clearly set forth by Allport (1): "There is one important reason for the permanent existence of the midwife in our community, which should appeal even more to the independent American than to the individual accustomed to the state paternalism of European countries. The midwife often is the alternative which the self-respecting laboring man and his wife choose rather than accept either charity or subsidized help. Dispensaries, district nurses, social centres, lying-in hospitals, suggested to take the place of the midwife, are apt, when offered or accepted thoughtlessly, to result in the pauperization of many a family which should be entitled to pay for its own service in its own home, and at its own price. Such cheaper service is furnished and can be furnished only by the midwife. The problem obviously becomes one of the making the best of a profession, which cannot be eliminated. The midwife has a permanent and legitimate place in the community, and she should be allowed to fill it under laws which should be reasonable, modern and well enforced. The state should provide facilities for the proper training of midwives."

A Joint Committee of the Chicago Medical Society and Hull House, which investigated the conditions in Chicago (7) in its report stated: "At the outset this committee recognized two facts, that midwives now and probably for years to come are socially inevitable, and that the present laws governing midwifery are grossly inconsistent with the laws governing medical practice." It is interesting to refer, in this connection, to the very peculiar situation existing in Massachusetts, where the midwife is not recognized as a legal practitioner, although her signature is accepted on the legal birth return.

Yet Emmons and Huntington (6), who undoubtedly studied this problem very thoroughly, insist that the midwife could and should be eliminated completely. She should be replaced by obstetric outdoor clinics, by extension of the work of the visiting nurse, and by improved lying-

in facilities in general and special hospitals. These authors are forced to this conclusion, because the only other possibility of dealing with the problem—namely, by training, licensing, and supervising the midwife, as is so thoroughly done in Europe, has proved unsuccessful. European obstetricians, especially in Germany and Austria where strict regulations have been in force for more than a hundred years, have repeatedly expressed, in recent times, their dissatisfaction with conditions. It certainly seems striking that only recently the Austrian Union of Midwives on their own accord sent a delegation to the Secretaries of Education and of the Interior, expressing among other things the wish that the required study for midwives in an obstetric university clinic should be lengthened to two years in the future. We may conclude a similar dissatisfaction with existing conditions in Switzerland from the fact that the municipality of Zurich has allowed the people to vote on the proposition to supply medical assistance and lay attendance free of charge to all obstetric cases in the city, at a maternity or in the home. The only provisions are that the woman must be a resident in the city at least one year and the family income not over $400.00 annually.

The demand made by some writers to adopt in this country, for midwives, the European standard of training seems decidedly preposterous when we remember that it is notorious that our facilities to train even our medical students in this branch of medicine are absolutely inadequate. The recent papers of Williams (16), Hirst and others, emphasizing this highly deplorable fact, have aroused extended discussion, but so far have not been contradicted. The writer has already quoted Huntington's opinion that "in this country obstetric practice has been allowed to sink to a frightfully low level." Very pointedly Wile (15) says: "When so much stress is laid upon the ignorance of the midwife, it behooves us to remember that eleven states still have no provision in laws for the preliminary education of physicians."

If, however, in the opinion of such experts as health commissioners, boards of health, and practical charity workers, midwives under present conditions, at least in certain communities, are indispensable, then it undoubtedly becomes the obvious duty of a licensing government, state or municipal, to insist on their proper education and provide the opportunities for their training. At present there exists in the United States only one midwifery school under municipal control, and this was established very recently in Bellevue Hospital, New York. The duration of required attendance there is six months. Edgar, like Miss Van Blarcom, would be satisfied with education and regulation as at present required in England, but Emmons and Huntington consider this insufficient. Their educational standard really implies elimination by education. "The midwife never has made and never can make good until she becomes a practising physician, thoroughly trained."

If the midwife is actually indispensable, then it certainly is the further duty of the government, state or municipal, to grant her a license to practise after it has been proved, by a successful examination, that she possesses sufficient theoretical and practical knowledge. It would seem superfluous to demand that such an examination should not be a mere matter of form, or a farce. The laws of Illinois demand a written examination, and peculiarly enough the Chicago Commission found among the practising midwives in that city a large number of analphabetes, unable to read or write in any language. In Balti-

more 25 per cent. of the investigated midwives were found unable to read or write. The frequent necessity of employing interpreters and translators for such examination offers an easily available opportunity for fraud, as illustrated with striking examples by several writers.

The trained, examined and licensed midwife must be carefully supervised in her practice. This is the experience of Europe. The most effective form of supervision seems to have been found in the short-term license, which, in the opinion of the Chicago Committee, to avoid graft and hardship should be renewed at stated intervals without the payment of additional fees. In this manner the supervising authorities are kept in touch with the midwives continuing in practice.

The most recent legislation regulating the practice of midwifery has been passed in the state of Pennsylvania. Newmayer (12) discussing these new laws points out their two chief defects. (1) A clause exempts midwives, in practice more than ten years, from examination. This is bad because it is the old midwife who is the most dangerous. (2) The law gives a permanent license, which is a mistake. This prevents continuous supervision which, in the profession of midwifery, is as important as the licensing itself.

The view has been expressed repeatedly and seems plausible that proper recognition, sufficient training and intelligent supervision of the midwife will give her caste and dignity, and will lead to the very desirable result of having a more intelligent type of woman enter the profession. It could be expected that this result alone would automatically diminish, if not actually eliminate, the participation of the midwife in criminal abortion. It may be mentioned in this connection that Yarros and others have made the very acceptable suggestion to replace the midwife by a specially prepared trained nurse. Nurses, carefully selected, should be instructed theoretically and practically in midwifery, and then would easily prove superior to the present-day midwife.

The writer had occasion to refer to the striking fact that we often find physicians vigorously combating the well-meant efforts of legislatures, health officers and social workers to improve the midwife situation by proper regulation. This open fight is carried on under the just claim that official recognition of the midwife would undoubtedly render her elimination impossible. This elimination, however, would seem very desirable from the point of view of the physician, not only in the interest of the life and health of mother and new-born child, but also for economic reasons. Under present conditions the physician is forced to meet the competition of an uneducated, incompetent woman who is either legally permitted, or actually tolerated to practise a branch of medicine. According to Huntington, the obstetricians, among all the medical men of England, alone urged the passage of the Midwife Bill, because they recognized the worst results of the old regime, and felt that any change must be an improvement. The general practitioner fought the bill. Now we see the tables turned. For the most part, the general practitioners are in favor of the changed conditions. The midwife works with the practitioner and saves him much wearisome and unprofitable work. The general community is probably better off at the present time, because in the past midwives were numerous and very dirty, whereas, now they are comparatively clean. But the obstetricians are feeling considerable regret, for they find that England is becoming satisfied with the midwife instead of with the physician; a fact which must steadily make for a lower obstetrical standard. The writer wishes to

refer to the noteworthy fact that in 1910 when the new Midwives Act of 1902 had come into full force, there were 29,000 midwives on the roll, a number about equal to the physicians in the country.

Summarizing all the foregoing quotations from literature concerning the regulation problem of midwifery, we must conclude that though the foreign population of this country demands the midwife, this country at present is unable to furnish them with a midwife who is not a recognized menace to the life and health of the young mother.

While elimination and regulation thus do not offer the sought for solution of the midwifery question, the third possible method of dealing with this problem—namely, education of the public, seems the most promising.

"The stupid indifference of society to the dangers which menace the public health from the plague of venereal diseases," writes Morrow, "is largely the result of ignorance." It is this same indifference and ignorance concerning the danger of puerperal infection due to careless, unclean and unscientific obstetrics, which in this country has permitted the continuation in practice of a most dangerous and incompetent type of midwife.

Huntington's argument is convincing. "In a matter as this, legislation is powerless. The keynote is education. We must educate the general public to realize the necessity for good obstetrics and place the means of obtaining it at the disposal of all, and then with or without laws against the midwife, she will disappear from our cities." In such an educational campaign a well-conducted maternity dispensary is a most essential factor. Visiting nurses must carry the work of instruction into the home. These same dispensaries and increased facilities for maternity cases in hospitals will furnish the required opportunity for better training of medical students, and will eliminate the practitioner incompetent to handle obstetrical cases. Obviously, this education first of all should reach the ignorant immigrants. Huntington believes in the feasibility of placing into their hands, upon arrival in this country, a statement of the true facts as to midwives and doctors, explaining that these terms in America are not necessarily equal to their known European value.

Far-reaching would be the effect of a more progressive attitude of the Life and Health Insurance Companies. An inquiry made by Mabbot (11) revealed the fact that at present these companies do not discriminate against the midwife, handling on equal terms women likely to be attended by midwives and those who employ physicians. In view of existing conditions, with all obstetrics among the poorer class "at a frightfully low level," this cannot be surprising, but a great deal would be gained in educating the general public if the insurance companies could be prevailed upon to give better terms to those willing to employ physicians, or to make use of maternity dispensaries or hospitals.

Most of the educational work, however, will have to be done by the social worker. His influence already is noticeable. According to Mabbot 92 per cent. of the Italians still employ midwives. On the other hand, in the Out-Patient Department of the Boston Lying-in Hospital 83 per cent. of all patients are foreign born, the majority of them being Russian Jews. This same condition probably can be found in every other maternity dispensary or hospital in large cities. Jews are in the majority in the New York Lying-in Hospital and also in the work of the St. Louis Obstetric Dispensary. This difference in the attitude of Italians and Jews toward proper obstetrical attention, in

the writer's opinion, is chiefly due to two facts: (1) to the greater interest of the Jew in the preservation of his health, and (2) to the better organization of charity work among the immigrant Russians as compared with the Italians. Mabbot and Huntington appeal to the settlement workers to direct all their efforts towards educating women, convincing them of the superior advantages of physician and nurse during childbirth, whom they can have free of charge, if poor. The prevalence of the Jewish patient in the obstetrical dispensary and hospital, in the writer's belief, justifies the hope that the final extermination of the midwife in this country by means of education, within reasonable time, will be effected by the settlement worker.

"Let us teach our immigrants," Huntington concludes his valuable paper, "that in America we believe in equality, as near as possible in an equal chance for life, health and happiness to each child at birth— a single standard of obstetrics for all."

HEMORRHAGIC DISEASE OF THE NEW-BORN.

A REVIEW OF RECENT LITERATURE.

By Jules M. Brady, B. S., M. D., of St. Louis.

1. Mellanby (*Journ. of Phys.*, Vol. 1, 1909).
2. Young and Richards: Hemorrhagic Disease of the New-Born. (*Boston Med. and Surg. Journ.*, Vol. CLXII, p. 47, 1910.)
3. Nicholson: Report of a Case of Melena Neonatorum Due Apparently to an Infection by the Bacillus Pyocyaneus. (*Amer. Journ. Med. Sciences*, CXX, p. 417, 1900.)
4. Townsend: The Hemorrhagic Disease of the New-Born. (*Arch. Pediat.*, Vol. XI, p. 559, 1894.)
5. Kilham and Mercealis: Hemorrhagic Disease of the New-Born. A Report of 10 Cases. (*Arch. Pediat.*, Vol. XVI, p. 161, 1899.)
6. Hamill and Nicholson: Infections of the New-Born. (*Arch. Pediat.*, Vol. XX, p. 641, 1903.)
7. Finkelstein: A Case of Hemorrhagic Diathesis. (*Berl. klin. Wochenschr.*, Vol. XXXII, p. 497, 1895.)
8. Hess: Syphilis Hæmorrhagica Neonatorum. (*Arch. Pediat.*, Vol. XXI, p. 598, 1904.)
9. Schwarz and Ottenberg: The Hemorrhagic Disease of the New-Born with Special Reference to Blood Coagulation and Serum Treatment. (*Amer. Journ. Med. Sciences*, Vol. CXL, p. 17, 1910.)
10. Lucas: Recent Experimental Work on Hemorrhagic Conditions. (*Boston Med. and Surg. Journ.*, Vol. CLXI, p. 731, 1909.)
11. Duke: The Relation of Blood Platelets to Hemorrhagic Disease. (*Journ. Amer. Med. Assoc.*, Vol. LV, p. 1185, 1910.)
12. Sahli: The Nature of Hemophilia. (*Zeitschr. fuer klin. Med.*, Vol. LVI, p. 264, 1905.)
13. Bernheim: The Relation of the Vessel-Wall to Coagulation of the Blood. (*Journ. Amer. Med. Assoc.*, Vol. LV, p. 283, 1910.)
14. Lambert: Melena Neonatorum, With Report of a Case Cured by Transfusion. (*Medical Record*, Vol. LXXIII, p. 885, 1908.)
15. Swain, Murphy and Jackson: A Case of Hemorrhagic Disease in the New-Born, With Transfusion from the Father. (*Boston Med. and Surg. Journ.*, Vol. CLXI, p. 407, 1909.)
16. Guttmann: Treatment of Melena Neonatorum. (*Therap. Monatsschr.*, Vol. XIII, p. 552, 1899.)
17. Tuley: Hemorrhagic Disease of the New-Born. (*Journ. Amer. Med. Assoc.*, Vol. LI, p. 2215, 1908.)
18. Leary: The Use of Fresh Animal Sera in Hemorrhagic Conditions. (*Boston Med. and Surg. Journ.*, Vol. III, p. 73, 1908.)
19. Welch: Normal Human Blood-Serum as a Curative Agent in Hemophilia Neonatorum. (*Amer. Journ. Med. Sciences*, Vol. CXXXIX, p. 800, 1910.)
20. Schloss and Commiskey: Spontaneous Hemorrhage in the New-Born. (*Amer. Journ. Dis. Children*, Vol. I, p. 276, 1911.)

21. Schloss and Commiskey: The Etiology and Treatment of the So-
     called Hemorrhagic Disease of the New-Born: With Report of
     Cases. (*Amer. Journ. Dis. Children*, Vol. III, p. 216, 1912.)
22. Weil (*Medical Record,* p. 322, August 22nd, 1908).
23. Bienwald (*Deutsch. med. Wochenschr.,* p. 28, 1897).
24. Robert and Chody (*Lancet,* Vol. II, p. 1472, November 13th,
     1909).

Townsend first called attention to the propriety of separating cases
of spontaneous hemorrhage occurring in the early days of life from those
which arise later. All these cases he has grouped under the caption
"Hemorrhagic Disease of the New-Born." It includes a number of differ-
ent affections, the presence of hemorrhages being the dominating symp-
tom. As a matter of fact, it is but a symptom which may be due to
a number of different causes. Characteristic of the disease is the fact
that it occurs, as a rule, during the first ten days of life, usually on the
second or third day, and furthermore seems to run a self-limited course.

The following is a clinical history of a typical case. A baby usually
strong and vigorous at birth, on the second or third day of its life,
without any apparent reason, vomits some blood. The stools also show
the unmistakable presence of blood. Bleeding may also occur from the
umbilicus. Jaundice is often present and ecchymoses of varying extent
may appear under the skin. The temperature is usually elevated. The
next four or five days witness an aggravation of the above symptoms at
the end of which time death occurs in the majority of the cases. The
surviving babies gradually improve and ultimately go on to complete re-
covery.

Until recently the hemorrhages have been little influenced by treatment
and the mortality has ranged from 50 to 75 per cent. After cessation
of the hemorrhages, which usually last from one to six days, surgical
operations have been performed with no recurrence of the bleeding.
Clinically, these cases may be divided into two varieties: (1) Cases of
multiple hemorrhages in which almost any organ or tissue of the body
may be affected; and (2) cases of hemorrhage from one place only. In
Townsend's collection of 50 cases, the location was as follows: Intes-
tines, 20; stomach, 14; mouth, 14; nose, 12; umbilicus, 18; subcutaneous
ecchymoses, 21; abrasion of skin, 1; meninges, 4; cephalhematoma, 3;
abdomen, 2; pleura, lungs and thymus, 1 each.

Many of these cases owe their etiology to bacteria, and various micro-
organisms have been recovered from the blood of some of these in-
fants. These little patients, however, usually show no external evi-
dence of infection and are often strong and vigorous. Likewise syph-
ilis may be at the bottom of the trouble.

Hemorrhages from the gastro-intestinal tract, to which the term
melena neonatorum has been given, have attracted considerable atten-
tion. In some of the cases ulcers have been found post-mortem; in the
majority of the cases nothing but congestion of the mucosa was found.
Small hemorrhages from the vagina are frequent in new-born babies;
they are of no significance and have no connection with this condition.
They have even been termed physiological. Umbilical hemorrhage is a
frequent variety secondary to septic infection. Accidental hemorrhage
from the cord, as the result of inefficient ligation, is not considered here.
Important to be remembered is the fact that these are never cases of
hemophilia, since this disease almost never manifests itself during the

early months, and, furthermore, infants who recover do not subsequently prove to be bleeders. These hemorrhages are only slightly more frequent in males, while in hemophilia they predominate 13 to 1.

In a given case of spontaneous hemorrhage, with syphilis and bacterial infection excluded, the cause of the hemorrhage must be sought in lesions of the vessel-wall or in defective blood coagulation. The exact nature of this third group is still involved in obscurity. At this point, wide gaps exist in our knowledge, and until these are bridged over and the minutest details of the mechanism of blood coagulation understood, we cannot expect to explain the cause of all these hemorrhages.

According to Mellanby, coagulation of blood is ultimately due to the action of fibrin ferment on fibrinogen. Fibrin ferment does not circulate in the blood, but is produced when any tissue is injured so as to liberate thrombokinase in the blood-stream. This kinase, in conjunction with the calcium salts present in the blood, generates fibrin ferment from the prothrombin associated with the fibrinogen; and the production of fibrin ferment in molecular continuity with the fibrinogen ensures that coagulation will take place in the shortest possible time. Coagulation of the blood in wounds is much hastened by the thrombokinase which is set free by the injured tissue cells. Any fibrin ferment present in the blood is neutralized by antifibrin ferment which is present in large amounts in normal blood. Its function is to prevent the occurrence of an extending coagulum due to the passage of fibrin ferment from its original seat of formation, and not to prevent the coagulation at the site of the injury. In the coagulation of the blood five factors then are essential: (1) Calcium salts, (2) kinase, (3) prothrombin, (4) fibrinogen, (5) fibrin ferment. When these elements are all present in proper amounts, we have formed a normal clot; a diminution or absence of any one of these results either in an inferior clot, or the blood remains fluid. If the calcium salts are diminished, the coagulation time is greatly delayed; if the same are entirely removed, as may be done by precipitating with ammonium oxalate, no coagulation whatever occurs. If the salts are normal in amount and the prothrombin absent, the onset of the coagulation time will be normal, but there results a homogeneous gelatinous coagulum. If the kinase is absent, the blood does not coagulate at all and remains fluid like the serous exudates.

Finkelstein found bacterial infection in all of 7 cases of the disease; and some German authorities even assert that bacterial infection is invariably the cause of the hemorrhages. Nicholson observed that out of 1500 births at Sloane Maternity Hospital, during a period free from puerperal infection, there were no cases of hemorrhage, but in a subsequent 225 deliveries, during the prevalence of puerperal infection, there were 8 cases of hemorrhage. Townsend remarks that the proportion of the cases in the hospital is nearly 6 times greater than in the out-patient department. The self-limited character of the affection, the elevated temperature in some cases, and the greater prevalence in hospitals, he believes are arguments in force in favor of an infectious origin. While bacterial infection and syphilis play an important rôle in the causation of the disease, a number of cases are reported in which blood-cultures failed to show a growth. A wide variety of bacteria have been recovered in pure and mixed cultures. In this connection, the following should be mentioned: The typhoid bacillus, pus cocci, colon bacillus, bacillus enteritidis, bacillus lactis aërogenes, the diphtheria bacillus, the bacillus

hemorrhagica of Kolb, the pneumococcus, and bacillus of Friedlander. As to the explanation of how the hemorrhages are brought about in the infectious cases, it has been suggested that a local defect in the vessel-wall, as the result of the action of the bacteria, is not the only factor, but owing to the production of toxins within the body, which act chemically either as inhibitory agents on coagulation, or by locking up in a loose chemical union the available normal factors that enter into coagulation, these two factors share the responsibilty.

Congenital syphilis is generally believed to be next in importance to bacterial infection in the causation of the hemorrhages, which are supposed to occur in this disease as the result of changes in the vessel-wall. A variety of bacteria has been recovered from the blood of many of these hemorrhagic luetic infants, which led some observers to the opinion that congenital syphilis was merely a predisposing factor to bacterial infection, the direct cause of the hemorrhage. We know positively, however, that in some instances of the hemorrhagic disease in syphilitic infants, bacterial infection could be absolutely excluded.

In various other hemorrhagic dyscrasias, such as purpura, the blood platelets are believed to play an important etiological rôle; normally they are found to the number of 450,000 to the cubic millimetre. Duke and others have found them much diminished in these conditions; and it is believed from experimental work that prothrombin is derived from the platelets. The onset of coagulation may be within normal limits, but clot retraction is defective or absent. There is evidence that in the hemorrhagic disease of the new-born the blood-platelets are normal in number.

Schwarz and Ottenberg studied 2 cases of hemorrhagic disease in which there was an impaired blood coagulation: one the result of congenital syphilis, the other bacterial infection. In the latter case, they were of the opinion that absence of thrombokinase might have been the factor. A drop of ascitic fluid was added to a drop of the baby's blood; no coagulation occurred. As serous fluids contain all the elements necessary to coagulation except kinase, they felt justified in believing that if the baby's blood had contained kinase, coagulation would have occurred. Kinase, the substance which Sahli believes is absent in hemophilia, is due to a cellular anomaly of the blood corpuscles and the endothelial cells of the vessels.

Schloss and Commiskey investigated the coagulation time in 10 cases. In 4 it was practically normal, in 2 it was slightly delayed, in 2 there was a decided delay, while in 2 other cases it was greatly delayed or absent. They came to the conclusion that deficiency, or absence of fibrinogen or thrombin, may give rise to imperfect blood coagulation and uncontrollable hemorrhage, and that in cases of hemorrhage of the new-born, in which blood coagulation is apparently normal, it seems probable that the hemorrhage is due to some localized vascular lesion or defect present only in the areas from which the bleeding occurs.

Treatment.—While our knowledge of the nature of many of these cases classified under this caption is very incomplete and will hardly advance until physiologists furnish us with more data, the results of treatment in recent times have been very gratifying. Of drugs, a long list has been recommended. Ergot, iron, adrenalin, and gelatine are a few. The opinion of many is that these infants have gone on to death or recovery regardless of the treatment. The writer, some years ago, had under his care at St. Ann's Infant Asylum (St. Louis), a strong,

vigorous new-born babe which on the third day vomited a profuse amount of bright red blood; the stools were tarry for several days. Believing in the futility of drugs, nothing was ordered except whey, to which a small amount of condensed milk was added. The baby made a good recovery.

It was thought for a time, owing to the important part played by the calcium salts in the coagulation of the blood, that they would be of great value in this condition. Test-tube experiments show that the addition of calcium, to blood-plasma which has been prevented from coagulation, does increase the coagulability; but, when administered to a patient, it has been shown that the ionizable calcium salts, the form that enters into the coagulation of the blood, can be so slightly increased that the coagulability is not affected in the least. Clinical experience shows that little is to be expected from this method of treatment.

Weil, of Paris, directed attention to the therapeutic possibilities of animal blood-sera, although Bienwald employed human blood serum locally in a severe hemorrhage of a hemophilic child, with a successful result, several years before. Horse and rabbit sera, which must be fresh, have given good results. As the injection must frequently be repeated, their use has been curtailed owing to the danger of anaphylaxis. It is not advisable to give subsequent injections after a lapse of ten days. Inside of this time as many injections may be given as desired.

Robert and Chody, in 1909, reported the use of dried horse serum as a hemostatic. They were led to try this because of the difficulty in securing promptly a supply of normal serum in hemorrhagic conditions. The serum was dried *in vacuo,* at a pressure of 2 mm. of mercury and at a temperature of about zero C. They believed the serum retained all its properties, both in the dried state and after having been redissolved in water. Externally, it was useful in various profuse hemorrhages; internally, the dried serum was given in cachets. Most observers insist that the blood-serum must be fresh owing to the fact that the action of fibrin ferment is interfered with after a few weeks.

Welch, of New York, two years ago, called the attention of the profession to the phenomenal results following upon the subcutaneous injection of human blood-serum. Up to April, 1911, he had treated 18 of these cases without a single fatality. His favorable results have been corroborated by others. In the moribund cases, a blood transfusion would be indicated. In this manner, we would supply all the elements for the actual increase in the coagulability of the blood.

A number of successful transfusions are reported, but owing to the delicacy of the blood-vessels in the new-born, and the difficulty of the operation, the majority of the cases should be subjected to the simple operation of hypodermic administration of human blood-serum.

Schloss and Commiskey treated 7 cases, with one death. They prefer the use of whole blood in the place of serum. The required amount is withdrawn from a vein of the forearm from one of the parents, and immediately injected under the skin of the baby. That this is simpler than allowing the blood to clot and then drawing off the serum as advised by Welch, is the claim of Commiskey and Schloss, and is borne out by the experience of the writer. 40 to 60 c.cm. should be injected every three or four hours until the hemorrhage ceases.

CONGENITAL SYPHILIS.

A REVIEW OF RECENT LITERATURE.

By Alfred Friedlander, M. D., of the Editorial Staff.

---

1. Haavaldsen: Spirochæta Pallida in the Nasal Secretion in Congenital Syphilis. (*Archiv. Derm. und Syph.*, Vol. CX, p. 211, 1911.)
2. Shmamine: A Rapid Method of Staining for the Spirochaeta. (*Zentralbl. fuer Bakt.*, Vol. 61, p. 410, 1911.)
3. Marshall: The Paternal Transmission of Syphilis. (*British Journ. Dis. Chil.*, May, 1912.)
4. Dominici: Changes in the Umbilical Cord in Congenital Syphilis. (*Riv. de Clin. Pediatr.*, Vol. IX, p. 613, 1911.)
5. Weiss: Chancre of the Scalp in an Infant. (*Berl. klin. Wochenschr.*, Vol. 48, p. 792, 1911.)
6. Pollak: Syphilitic Arthritis. (*Allgem. Wien. med. Zeitschr.*, Vol. 66, p. 538, 1911.)
7. Fitzwilliams: Syphilitic Affections of the Bones in Childhood. (*Brit. Journ. Dis. Chil.*, March, 1912.)
8. Barbier and Grassier: Lesions of the Central Nervous System in Congenital Syphilis. (*Archiv. de Méd. des Enf.*, p. 157, February, 1912.)
9. Rach: Syphilitic Leptomeningitis in Nurslings. (*Jahrbuch fuer Kinderheilk.*, Vol. 75, p. 222, 1912.)
10. Heine: Symptomatology of Congenital Syphilis in Childhood. (*Jahrbuch fuer Kinderheilk.*, Vol. 72.)
11. Koenigstein: Parasyphilitic Diseases in Childhood. (*Wien. klin. Rundsch.*, No. 29, 1911.)
12. Chislett: Syphilis and Congenital Mental Defect. (*Journ. Ment. Sciences*, Vol. 47, p. 499, 1911.)
13. Vas: Later Development of Children Born with Syphilis. (*Jahrbuch fuer Kinderheilk.*, Vol. 75, April, 1912.)
14. Leroux and Abbé: Sero-Diagnosis of Congenital Syphilis. (*Arch. de Méd. des Enf.*, December, 1911.)
15. Churchill: Wassermann Reaction in Infants and Children. A Clinical Study. (*Amer. Journ. Dis. Chil.*, June, 1912.)
16. Lucas: The Wassermann Test—A Résumé of Current Literature. (*Amer. Journ. Dis. Chil.*, April, 1912.)
17. Marshall: Morbidity and Mortality in Hereditary Syphilis. (*Brit. Journ. Dis. Chil.*, January, 1912.)
18. Bunch: Heredo-Syphilis and Its Treatment by Salvarsan. (*Brit. Journ. Dis. Chil.*, April, 1912.)
19. Wilde: Experience with Salvarsan in Congenital Syphilis. (*Jahrbuch fuer Kinderheilk.*, Vol. 75, January, 1912.)
20. Noeggerath: Salvarsan Treatment of Congenital Syphilis. (*Jahrbuch fuer Kinderheilk.*, Vol. 76, February, 1912.)

21. Bokay and Vermes: Salvarsan in Syphilis of Children. (*Wien. klin. Wochenschr.*, Vol. 24, p. 583, 1911.)
22. Leiner: Collective Abstract of Dermatological Literature for 1911. (*Monatschr. fuer Kinderheilk.*, Vol. X, No. 11, 1912.)

Etiology.—Haavaldsen examined the nasal discharge for the spirochæta pallida in thirty new-born syphilitic children. In one-fifth of the preparations made, the spirochætæ were found, being most abundant in cases where the skin and mucous membranes showed marked lesions. He concludes that this method of examination is not of great diagnostic importance.

Shmamine gives a very simple fuchsin-staining method which has proved very satisfactory in his hands.

In a careful study including a review of the literature, Marshall concludes that there is not sufficient evidence at hand to justify the renunciation of the doctrine of the paternal transmission of syphilis. The clinical evidence is almost wholly in favor of this view. He quotes Hutchinson in conclusion, as saying: "It is improbable in the highest degree that a large number of married women should acquire syphilis in its primary form, pass through its secondary stages, and yet never know it. Yet this is the supposition which one must adopt, not once or twice, but as being an everyday occurrence if we reject the belief that a syphilitic father may beget a syphilitic child quite independently of any previous infection of its mother."

Clinical Symptomatology.—Among the rarer clinical manifestations, the following have recently been reported. Dominici has made a careful study of the umbilical cord in 7 cases. In the majority of cases the cords are thickened to double their size, the lesions being most marked at the placental end. Spirochætæ were abundant, even without gummatous nodules in the cord. The specific organism is almost always found in the umbilical cord of syphilitic infants, an important clinical fact.

Weiss reports a rare case of chancre of the scalp in an infant. Only 20 other cases are reported in the literature. The infant developed two hard chancres close to one another in the scalp, three weeks after birth. The source of infection was not clear, as the mother, who had undergone several inunction cures, did not present any lesions. The case is a remarkable exception to Profeta's law, inasmuch as the child was not immune in spite of the mother being syphilitic.

Pollak reports the case of a boy of five with long-standing swelling of both knee-joints. Salicylates were without effect. X-ray negative, the Wassermann reaction positive. He also reports a similar case in a girl of eleven, cured by salvarsan.

Discussing the syphilitic bone affections of childhood, Fitzwilliams says that the commonest manifestation is periostitis, which may be either local or generalized. It is seldom seen before the age of four years, more commonly at six. It often follows the receipt of some slight injury in the local or nodal form.

The generalized form spreads over the whole shaft of the bone, but very rarely encroaches upon the epiphyseal portion. Syphilitic osteomyelitis is a condition in which the whole thickness of the bone is attacked and is replaced more or less completely by gummatous tissue. This tissue may eventually completely dissolve the continuity of the structure without necessarily discharging through the skin.

The destruction of the interior usually goes on more rapidly than the formation of new bone externally from the periosteum, so that parchment-like cracking is felt. If the skin is red over the swelling, the classical picture of a rapidly growing sarcoma is reproduced, except that the margins of the gumma are not quite so well defined as those of a sarcoma.

Barbier and Grassier report a series of cases illustrating the lesions of the central nervous system in congenital syphilis. Syphilitic epilepsy, acute, syphilitic meningitis, chronic specific meningomyelitis, specific cerebral tumor and specific multiple sclerosis are all recorded. Of the last mentioned condition a case with cure under mercurials is noted. Rach reports a case of syphilitic leptomeningitis in an infant of four months. The spirochæta pallida was found in the cerebrospinal fluid. The necropsy showed marked hyperemia of the pia, with exudate, both fibrinous and purulent. The author mentions other cases from the literature (the number of recorded cases is not great). He holds that the presence of the spirochætæ, in the cerebrospinal fluid in infants, is proof of a severe active syphilitic disease of the brain cord or membranes, unless it be shown that spirochætæ are circulating free in the blood.

Heine calls attention to a common, exceedingly important symptom of congenital lues, one that is not particularly well known—namely, optic neuritis. In 105 cases of lues in infants, this symptom was present 86 times, i. e., in 81.9 per cent. of the cases. The outlook under proper treatment is usually good.

Another symptom not usually recognized is the peculiar nocturnal cry of luetic infants. Heine considers it to be a manifestation of meningeal irritation. While this symptom may only be accepted as "specific" with caution, it is nevertheless of diagnostic value, because it often sets in before the advent of other symptoms.

Kœnigstein discusses the parasyphilitic lesions of childhood, calling particular attention to the fact that lues may be the basis of many cases formerly classed as denegerates, as errors of development, or other unexplained dyscrasias.

Among parasyphilitic manifestations to be noted are errors in the development of the teeth, hypoplasia or dysplasia of individual organs, general disturbance of development of the organism, with unusual lack of resistance to disease.

Infantilism is frequently luetic; also anemia, hemorrhagic diathesis, paroxysmal hemoglobinemia. The lesions of the central nervous system are, of course, numerous and varied, and need not be recapitulated here. With reference to the relation of syphilis to congenital mental defect, Chislett believes, as a result of his studies, that it plays a larger part than is generally supposed. The Wassermann test has shown that a very large percentage of idiots had syphilitic antecedents. In not a few cases of congenital mental defect, the patient himself gives a positive test.

A careful study of a series of children, born with syphilis, many of whom had, however, been promptly treated, has convinced Vas that Heubner's dictum is correct. This is to the effect that syphilis has a definite weakening depressing effect on all functions of the organism. Detailed study of the various children is appended, but the findings are well summed up in the foregoing statements.

Diagnosis. The Wassermann Reaction.—Leroux and Abbé conducted

an extensive series of examinations, relative to the serodiagnosis of congenital syphilis, using the material of one of the large Paris children's dispensaries. Over 300 tests were made and whenever possible, the parents, sisters, and brothers of the patients were tested also. A large proportion of the children examined was atrophic. The authors conclude that congenital syphilis is a much more frequent cause of the dystrophies of childhood than either tuberculosis or alcohol in the antecedents. The authors find that the study of serodiagnosis is much more complex in congenital than in acquired syphilis. A single test is often not sufficient, sometimes a series of tests of the same case must be made by the same person. In 108 children (aged one to thirty-six months) the Wassermann test was positive 67 times (66 per cent.). It was always positive in children showing skin, mucous membrane, or bone lesions.

85 per cent. of late heredo-syphilitic cases, and 11 per cent. of latent cases gave a positive reaction. The authors conclude that maternal syphilis is more often conceptional than derived by direct infection from the father. The mother is infected in the great majority of the cases. Active maternal syphilis with a positive reaction generally gives rise to virulent infantile syphilis, sometimes to latent syphilis with positive reaction, more rarely to infantile syphilis with negative reaction, occasionally to healthy children.

Latent maternal syphilis with negative reaction nearly always gives rise either to parasyphilitic affections or to healthy children. If the father and the child give a positive reaction, the mother always does. Treatment has no constant effect upon the reaction, and the latter gives no certain therapeutic indications. Serum diagnosis gives no precise information as to cure or immunity.

Churchill has made an examination of 102 children, none of whom entered the hospital with the diagnosis of syphilis, to determine in what proportion of such a series a positive serum test could be obtained. Speaking generally the children were anemic, undersized, with lymph nodes usually enlarged. 111 tests were made, 28 Wassermann and 83 Noguchi. The blood was used in 90 cases, the spinal fluid in 12 cases. There were 39 positive reactions (38 per cent.). Of these cases only 4 gave a definite history of clinical syphilis in another member of the family, or a positive Wassermann reaction in either parent. Of the positive cases that died, 9 came to autopsy. None gave macroscopic or microscopic evidence of syphilis post-mortem. The author concludes that on the basis of his study we are justified in holding that one child in three admitted to our large hospitals may be regarded as syphilitic; hence, there is a very large amount of congenital syphilis among certain classes in the community. He points especially to the large number of symptomless children who gave positive reactions, and believes that the importance of the serum test in anemic, malnourished children has been demonstrated.

Lucas gives a résumé of recent work with the Wassermann test, including a full description of technique. Also a discussion of recent work on the spirochæta pallida and its recognition.

With reference to Colles' and Profeta's laws, Lucas points out that the evidence now accumulated would clearly indicate that the period of immunity defined by Colles' law is really a period of latent syphilis as shown by reactions. A positive reaction in a high percentage of sound children from clinically syphilitic mothers similarly shows that

thus immunity defined by Profeta's law is only latency. It is well known that many of these so-called immune mothers and children later present evidence of syphilis. It should be made a rule to treat any such apparently sound mothers or children, who give a positive reaction as though they presented active evidences of the disease, and to exclude any wet nurse, who reacts positively, from nursing any but known luetic babies. Discussing morbidity and mortality in congenital syphilis, Marshall finds that recent studies have verified Fournier's statistics, which were as follow :—

	Mortality.	Morbidity.
Paternal transmission.	20 per cent.	37 per cent.
Maternal.	60 per cent.	84 per cent.
Mixed.	68.5 per cent.	92 per cent.

Paternal transmission gives rise more often to late heredo-syphilis and heredo-parasyphilis. When paternal disease is recent, virulent heredo-syphilis may occur in the offspring, but the duration of virulence is shorter in the father than in the mother.

Maternal syphilis causes more cases of virulent heredo-syphilis than paternal, and the virulence diminishes more slowly.

In mixed transmission, polymortality is more frequent, prolonged virulent symptoms generally more severe, and heredo-parasyphilis more common than in maternal transmission.

Treatment.—With reference to treatment Marshall thinks that most cases of active heredo-syphilis can be cured by mercurial treatment, which, however, must be prolonged for at least two years. On the other hand the dystrophies of heredo-syphilis or parasyphilis, including many incurable nervous and mental affections, are not influenced by mercurial treatment. Marshall thus takes strong ground against salvarsan : "It is well known that this drug has not fulfilled expectations and there is no proof that it cures syphilis. It is to mercury that we must look for the cure of syphilis and syphilitic heredity. In the present state of our knowledge, there is no short cut to a cure by a few injections of salvarsan or any other drug, nor is it likely that such a chronic infection as syphilis can thus be jugulated."

Discussing the treatment of congenital syphilis by salvarsan in England, Bunch admits that in that country the drug has as yet not found general acceptance. Based on his limited experience he holds that in salvarsan we have a drug which at least has wonderful powers of curing syphilitic symptoms rapidly, and when combined with mercury, of curing the disease in the shortest time possible, at present.

Wilde has treated 28 infants with salvarsan. While his results have been good, they were not better than with the mercury and iodide treatment. Skin and mucous membrane manifestations were quickly influenced, visceral lesions much more slowly. A case of infantile cerebral syphilis was not influenced at all. The intravenous method of administration is preferred. Deleterious effects were not noted in any case.

This last statement is also confirmed by the experience of Næggerath. He believes, however, that this was due to the fact that small doses (0.001) per kilogram of body weight were at first injected. Næggerath, too, finds that external syphilitic manifestations are influenced by salvarsan remarkably quickly. So far as permanent cure is concerned, he believes that the combination of salvarsan and mercury offers the best

outlook. In general, he believes that the drug is a valuable addition to our syphilis therapy in infants, though there are still some moot points, especially with reference to contraindications.

Bokay and Vermes reached practically the same conclusions. In addition they found salvarsan of great value in the treatment of interstitial keratitis. They recommend salvarsan in preference to mercury for breast-fed children in good condition, adding that time will show whether the effect will be durable.

Leiner offers a collective abstract of dermatological literature for 1911, containing a full discussion of salvarsan treatment from various standpoints.

SPECIAL ARTICLE.

PARACELSUS.
(Theophrastus Bombast von Hohenheim. 1493-1541.)

By Robert E. Schleuter, M. D., of St. Louis.

In 1481 the Abbot Conrad von Hohenrechberg of the aristocratic monastery at Einsiedeln in Switzerland (this place of pilgrimage was founded near Zurich by St. Meinrad who died in the year 861), summoned the learned doctor, Wilhelm Bombast von Hohenheim, from Suabia.

The fortune of the Bombast family having been greatly reduced, Wilhelm was educated for the profession of medicine so that he could earn his own living. He was not a barber or a bather, but a learned physician who had studied at Tuebingen and had earned the grade of Licentiate of Medicine. He lived quietly and studied chemistry and botany at Einsiedeln.

When he was thirty-four years old he married a member of a well-known family of the place, Ochsner by name. She was not the matron of the hospital, but a member of the church; a "woman of the house of God." In honor of his marriage in 1491 he had, according to the custom of the times, a portrait made. It now hangs in the Museum Carolina-Augusteum at Salzburg. (Fig. 1.)

On December 17th, 1493, their only child was born. This was Paracelsus. Theophrastus was his baptismal name. Aureolus and Philip are also applied to him. The latter might have been given him at baptism, but the former was bestowed gratis for some reason or other. Bombast (also spelt Banbast, Bambast, or Baumbast) has a direct reference to the inner fibrous bark of a tree. It was the family name of his noble ancestors, and bears no connection with the English word bombastic.

Conrad Bombast von Hohenheim, who lived in 1270, was a soldier and a feudal tenant of the Count of Wuertemberg. He died in 1299, leaving as his executor Friedrich von Hohenheim. This Conrad lived at the castle Hohenheim near Stuttgart, and a direct line of Bombasts von Hohenheim lead down to our Theophrastus. The Latin word "celsus," meaning "raised high," was suggested by the name "Hohenheim." It is said that his father, Wilhelm Bombast von Hohenheim, first called his precocious son Para-celsus (beyond celsus). Later it was continued as a latinization of his name, as was the custom of the academicians of his time, and also before him.

The house, in which Paracelsus was born, remained until 1814, when it was torn down and replaced by another of more modern style but less picturesque. This is now the Crown Hotel (*Gasthaus zur Krone*).

That the learned father was the first tutor of his son is certain; but, that the opportunities for botanical studies at Einsiedeln could have been of much profit to Paracelsus is hardly possible. For, in 1502, when Theophrastus was nine years old, his father moved to Villach in Carinthia, now a province of Austria. There he practised medicine for thirty-two years.

It is very likely that Theophrastus had early made up his mind to study medicine and follow the calling of his father. After the parental instruction he was taught by a number of clergymen of high standing. Most of them could not have helped him to any knowledge, save that of a religious nature. But from the cultured scholar, Abbot Johannes Trithemius of Sponheim, he could learn thoroughly and completely everything connected with science as known in that day.

Among his other instructors was also Sigmund Fueger. He must not be taken for Fugger, who is denounced by Paracelsus for having introduced and sold guaiac wood. In Fueger's laboratory there was opportunity enough to study alchemy. The alchemists were occupied in endeavoring to find the philosopher's stone: the means to prepare a chemical substance which would convert all the baser metals in a molten state into gold, cure all ills, make the body younger, and prolong life.

While in the lead and silver mining district with Fueger, Paracelsus gathered the knowledge which he afterwards embodied in his work on "Mountain Ailments." (*Von den Bergkrankheiten.*)

We do not know how long he remained here, nor when he took up the study of medicine at the universities; and to shape our knowledge of this period of his life, there is very little in the scanty records or in his own vague statements. It is believed that he studied in German countries and also in Italy and France. It has been stated that he probably graduated at Salerno. He wandered much and mingled with "barbers and bathers, women and necromancers." He participated in the Netherland, Danish and Venetian wars. In these he certainly gained knowledge of surgery.

During his travels he did not constantly apply himself to study, but even then attracted attention by his "miraculous cures" in so-called incurable cases. Finally, tired of this roaming life, he was attracted to Strasburg, which he hoped, for several reasons, to make his permanent home.

It must be understood that the surgery of that time was in the hands of the barbers and bathers, and that frequent differences arose between them and the doctors of their day. In Gerstorff's "Feldbuch der Wundartzney" (Book of Military Surgery), the precise limits of surgery are given. The surgeons treated the body with their hands, but the physicians did not give any manual treatment. The barber-surgeons were artisans who were far removed from the temples of education and their impractical "book-learning," and consequently were scorned by the university doctors. But, because of this, the surgeons stood higher in the estimation of the common people.

It would have been remarkable if Paracelsus had been well received by the doctors, after he bought the right of citizenship at Strasburg, on the Wednesday after St. Andrew's (November 30th) in 1526. To such an extent did the physicians of that city oppose him because he would not admit the difference between the high internal treatment and the humble external art of healing, that Theophrastus soon moved to

Basel at the solicitation of Froben, the "King of Printers." Paracelsus had relieved Froben of a chronic and very painful affliction.

Through Froben Hohenheim met Erasmus Desiderius of Rotterdam, as well as Oecolampadius (John Huessgen). The special recommendation of the latter led the Town Council to appoint Paracelsus Town Physician of Basel. This carried with it a chair in the university. There he quickly gained the applause of the students, but few if any of the physicians of the faculty took kindly to him. He made enemies of the apothecaries by asking permission of the Council to examine pharmacies as well as pharmacists in his capacity as Town Physician.

Fig. 1.—Dr. Wilhelm von Hohenheim, Father of Paracelsus. Painted in 1491, now in the Museum Carolina-Augusteum, Salzburg.

At Basel, as everywhere else, Paracelsus taught doctrines essentially his own, he having early taken exception to the existing methods of teaching. He denounced the custom of blindly following the works of the ancients; and, on the feast of St. John, 1527, the students having built and lit a bonfire in front of the university, Paracelsus seized the opportunity to throw a copy of Avicenna's "Canons of Medicine" into the flames, saying: "Into St. John's Fire so that all misfortune may go into the air with the smoke."

Similar demonstrations were frequent. He gathered adherents and disciples. His opponents aggravated him constantly, and he did not fail

to strike back. So things continued until the differences with a rich scribe eventually drove him out. The wealthy Canon Cornelius von Liechtenfels was afflicted with a severe gastric disorder. He remarked that he would present Theophrastus with 100 Gulden if he could cure him. Paracelsus gave him three pills of his "Laudanum." This produced a deep sleep, whereupon the patient felt greatly relieved and sent his doctor six Gulden and "his sincere thanks."

Paracelsus became incensed at this and sued Liechtenfels before the City Council. They rendered a verdict against the doctor. Following this decision, which he considered unjust, he issued a severe publication against the Council. This turned its members so strongly against

Fig. 2.—Théophraste Paracelse. From a portrait by Rubens. Musée de Bruxelles.

him that, in consequence of this hasty action, he hurriedly and secretly left Basel in July, 1528.

Wandering, roaming, writing, dictating and treating the sick, he went from place to place. He visited Colmar, Esslingen, Nuremberg, St. Gall and other towns. He wrote a Latin letter to Bonifacius Amerbach of Basel, stating that he had not yet been informed what action the magistrates had taken against him.

To Johannes Oporinus (John Herbst) we are indebted for the statement of Hohenheim's drunkenness. This man wrote in a letter to

Weyer that during the two or three years which he spent with him,
Paracelsus was scarcely not full of wine for an hour or two a day.
Oporinus had followed him from Basel several weeks after the French
leave of his master, but left him rather suddenly because of a joke.
Paracelsus had told him that a man's temperament would show in his
urine if he abstained from food for three days. So, after fasting the
required time, Oporinus brought his specimen, but was only greeted
with a laugh for his credulity. Angered at this, Oporinus returned to
his old wife at Basel, was professor of Greek for a time, and later
became a celebrated printer, who was especially noted for his marvellous-
ly correct publications.

In his later life, Oporinus again became a Paracelsist and regretted
above all two things. First, that he did not preserve the works of
Paracelsus, which he had received; and, secondly, that he had written
that letter denouncing the character of his master. This because he
only then appreciated what a great man Paracelsus had been.

Of the several portraits of Theophrastus Paracelsus, the one by
Rubens, in the Museum at Brussels, appears to be the best. (Fig. 2.)
Whether or not it is a good likeness, cannot be stated; it might, how-
ever, serve as a basis for our impression of him.

The writings of Paracelsus, most of which were published after his
death and not all of which are authentic, are principally dictations.
Very few of them were printed during his life. The vast number of
books, that are accredited to him, comprise works on alchemy, medicine,
natural history, philosophy, magic, and other subjects. More than fifty
of these are on medicine.

Paracelsus has been called the "Luther of Medicine," partly because
he was the first physician who dared to lecture in the German
language instead of in Latin, the accepted custom. He defied the
assertion of academicians that it was an unheard of profanation
to draw the high wisdom of Galen down to the common plane of
the mother tongue. At a time when learned men were even ashamed
of their German names, he forced admission of his mother tongue into
scientific writings. That language had not yet become the language of
learned men, and his bad grammar must not be counted too strongly
against him.

To be compared with Luther irritated him very much, for he was not
in sympathy with the Reformation. Though he recognized the abuses
in the Church, he said that Luther and the so-called reformers were doing
much more harm than good. Paracelsus lived and died a Catholic.

Because of the faulty grammar, the often incomplete statements of
ideas, and the many typographical errors, it is impossible to translate
his writings. To suit our purpose it seems best to enumerate only some
of his statements and contributions. His main works are called: Chirur-
gia Magna, Paramirum, Opus Paramirum, and Paragranum.

In many places his numerous works show what high ideals he had.
How he deprecated dishonesty and urged truth and love! In all mat-
ters, however, he rested upon his own resources, true to his motto:
"Who can be his own lord and master, should be no other man's servant."

He possessed a mysterious, intuitively anticipating wisdom, which he
frequently employed in making logical remarks which "struck the nail on
the head," although he might have been unable to formulate his chain
of reasoning. He thought and spoke in the spirit of the people.

His was a physiologico-biological foundation for the art of healing.

He considered life to be the basis for all efforts at study; but the proper methods of development of medicine upon such a foundation were foreign to him.

While his predecessors and contemporaries, as well as many who came after him, took exception to certain teachings of Aristotle, Galen, Avicenna and Rhazes, he sought to destroy the root of their systems because they had been, according to his opinion, proved unfit. At Basel, in a tirade against the practitioners of that city, he said: "Know, ye doctors, that my hat knows more than you—that my beard has more experience than your academies. Greeks, Latins, Arabs, French, Italians, Jews, Christians and Mohammedans, you must follow me; I shall not follow you, for I am your monarch and sovereignty belongs to me." In this and in many other ways did he show his intense hatred for mere "book-learning." We find him saying, "Reading never made a physician, only practice." He worshipped nature and her secrets, and continually attacked scholasticism in medicine, urging practical experience in therapeutics and striving for the union of medicine and surgery, as well as simplicity in treating wounds.

We find that through him the standpoint of medicine became completely changed, and chemistry became a necessary part of it. He said that the alchemy which makes gold and silver is not the true one; those who practise it are "threshing empty straw." His philosopher's stone was only a medicament. Like many of the most enlightened men of the sixteenth century, he was an adherent of astrology and magic; and was, of course, superstitious, thinking that he knew how to recognize witches. Some have said that he utilized this belief only to gain influence and reputation among his mystically inclined contemporaries. A deep insight into his character, however, shows that this can hardly be true. In his later years he seems to have changed his mind, for he states prophetically that before the end of the world it would be known that those arts, which are ascribed to the devil, are only natural phenomena.

He compared the diseases of the human organism (microcosm) with cosmic phenomena; apoplexy with lightning, dropsy with inundations, atrophy with drought, etc.

Paracelsus' basic idea was that each remedy influenced the spiritual force (*archeus*), not the material substance, because the medicines contained another spiritual force or active principle (*quintessence*). The quintessence could be gained from the drugs by making tinctures and alcoholic extracts. He therefore improved the preparation of tinctures and alcoholic extracts, and opposed the polypharmacy of the Arabians. Thereby he has earned the gratitude of all times. Incidentally, it may be mentioned that Elixir Proprietatis Paracelsi is still carried in our modern books on pharmacy as one of the names for tincture of aloes and myrrh.

Paracelsus recognized that the symptoms of an ailment are constant with its origin and general nature; and, like a number of others before him, he taught to give Nature a chance. His treatment was directed to aiding Nature.

His cardinal number was the figure five, and he uses it often in his classifications. For instance, he differentiated five principal kinds of influences upon disease (*entia*):—

(1) *Ens astrorum* (cosmic agencies); (2) *Ens veneni* (poisonous disease products); (3) *Ens naturale* (predisposition because of imperfec-

tions) ; (4) *Ens spiritale* (delusions, etc.) ; (5) *Ens deale* (providential influence).

Besides these etiological factors, Paracelsus recognized the geographical difference in diseases. Herein he was far in advance of his times.

His strongest point lies in therapeutics ; and his nomenclature of disease follows the remedies. He had two therapeutic aims: (1) To assist the *archeus* (force of nature) ; (2) to oppose the cause of disease. Some of his "arcana" were *contraria*, others were *similia*. He believed in the signature of things, as :—the seeds of pomegranate (like teeth) for toothache ; lungwort (spongy tissue) for lung affections ; the yellow juice of chelidonium for icterus ; orchid bulbs for testicular disease ; the thorns of thistle for sticking pains ; the pierced leaves of St. John's wort for punctured wounds, etc.

He taught that the force of life (*archeus*) consists of three elements : sulphur, mercury and salt. When an organic substance burns, that part which is destroyed by the fire is sulphur, that which volatilizes and rises as smoke is mercury, and the ash is salt. He said that "all ulcers proceed from the corruption of the salt that is in us." Upon the above basis he built his theory of the "tartaric disease." By these were meant gout and stone, which he said are the result of faulty activity of the *archeus* by which those substances which should have been eliminated from the body are heaped up at certain places.

He recognized the worth of dietetics and utilized many minerals, though he also had great faith in animal drugs. His disciples taught his theories under the name of spagyrical or hermetic medicine.

Ludus Paracelsi, his secret remedy for stone was called *Boracit*. It was a crystalline mineral composed of magnesium borate with magnesium chloride. He gave gold for purifying the blood, and mercury in syphilis. Those who treated syphilis with guaiac-wood were denounced in strong language and called "wooden doctors." Among other things Paracelsus used silver sutures and lead washes.

There is no doubt that Paracelsus invented the name laudanum, although his formula has never become accurately known. He may have used the term for several remedies. It is thought that he carried opium in the pommel of his sword, calling it the "stone of immortality."

Balneology is indebted to him for the use of the tincture of nutgall test for iron in mineral waters, and he also attempted their artificial preparation.

Paracelsus died in Salzburg on September 24th, 1541, in a small room of the "White Horse Inn," after a short illness, at the age of about forty-eight years, and was buried in the graveyard of St. Sebastian.

There is a wide difference in the statements regarding his death. The German physician, S. Th. von Soemmering, while examining the skull of Paracelsus, early in the nineteenth century, found a fracture of the left temporal bone. This assists in confirming the statement that he was attacked by the hirelings of his enemies and thrown from a cliff, dying of a fracture of the skull several days thereafter.

Some books on medical history tell us that he died in the hospital of St. Stephen or St. Sebastian. Some of the many varying statements are specific, while others are more or less general assertions. N. S. Davis writes: "He died of the combined effects of poverty, dissipation and disease." Gorton says that a stronger colleague threw him out of a window during a heated discussion. In the fall he suffered a fracture of the skull and probably instant death. It is also found in print that he was thrown downstairs.

That his death was preceded by prolonged suffering from a chronic ailment is shown by Sudhoff and others. The former takes as evidence a letter under date of March, 1540. Therein Paracelsus politely declines to visit an influential patient because of "weakness." He felt unable to make a trip of eighteen miles on horseback.

Diamonds, especially in powdered form, were believed to be a violent poison, despite the fact that, even at that period, slaves swallowed them to hide their theft. To the extraordinary hardness of that precious stone was attributed its supposedly deleterious effect on the intestines. Some of the pupils of Paracelsus claimed that his life was cut off by this agent.

Fig. 3.—The Monument of Theophrastus Parcelsus in St. Sebastian's Church, Salzburg.

At his death Paracelsus left very little. He had lived with the poor and distressed, and he made them his heirs. He left some money to the Shrine of the Blessed Virgin in his native town of Einsiedeln, and for masses for the repose of his soul. His will was made September 21st, 1541, before Notary Kalbsohr and witnesses.

Since 1572 his bones rest in the church of St. Sebastian, where his monument may be seen at the present time.

The red marble tablet placed on the first grave by Michael Setznagel, executor of his will, was made a part of the monument erected in 1753, and has the following inscription: "Here lies buried Philip Theo-

phrastus, the famous doctor of Medicine, who cured wounds, leprosy, gout, dropsy, and other incurable maladies of the body, with wonderful knowledge, and gave his goods to be divided and distributed to the poor. In the year 1541 on the 24th day of September he exchanged life for death. To the living Peace, to the sepulchred eternal rest."

This inscription is found in a "Pest Buechlein" (Plague Booklet) of 1554, and even during the nineteenth century his tomb was a shrine for worship in fear of cholera. Through a mistake his father's portrait was painted on the new grave. (Fig. 3.)

There is a large Paracelsus collection in the Museum and in the Benedictine foundation at Salzburg. His house in that city, Am Platzl No. 3, is now occupied by a pharmacist. It will soon be marked by a tablet for which subscriptions have been raised by members of the German Association for the History of Medicine and Natural Sciences.

The character of Faust might have been inspired by Goethe's knowledge of Paracelsus; and Robert Browning's long poetical work "Paracelsus" will no doubt keep his memory afresh in the minds of the English and American people. He has, however, never received proper recognition by the English speaking historians.

DIAGNOSTIC AND THERAPEUTIC NOTES.

SYPHILIS OF THE HEART.—Orkin (*Berl. klin. Wochenschr.*, No. 25, 1912). The investigations of the writer call attention to the frequency with which syphilis is responsible for myocardial changes, especially in young people. Any case of myocarditis, in which some other etiological factor is not obviously present, should be investigated as to the presence of syphilis. The signs that especially characterize syphilitic myocarditis are a sudden onset of the disorder, the early occurrence of angina pectoris, and fugitive edemas about the ankles. In every such case a Wassermann test should be made. Therapeutically, specific treatment alone is of any avail.

PHLEBOSTASIS.—Lilienstein (*Med. Klinik*, No. 8, 1912). A method of bloodless phlebotomy has given excellent results, in the writer's hands, in cases of broken compensation. The arm-band of a sphygmomanometer is placed about either an arm or a leg, close to its articulation with the body and inflated until the pulse disappears. This pressure is maintained for two or three minutes; the blood is then again allowed to flow through the limb for a few moments and this process is repeated three or four times. The result is an intense and prolonged passive congestion of the limb which acts upon the general circulation just like an extensive withdrawal of blood by means of venesection, without however depriving the body permanently of any of its blood. The dyspnea and oppression disappear, the accentuated second pulmonic sound becomes more nearly normal and the dilated right heart recedes. The best results are obtained in cardiac dyspnea, but the procedure is useful in impending apoplexy, in meningitis, in uremia; in short, whenever venesection might be indicated. The contraindications are: (1) A tendency to thrombosis; (2) edema or varicose veins of the extremity. The method should be used only by the physician himself and under his constant supervision.

HYPODERMIC USE OF EPSOM SALTS.—Robin and Sourdel (*Prog. Méd.*, No. 26, 1912). It appears from the work of Robin and Sourdel that magnesium sulphate given hypodermically is an effective purgative. One c.cm. of a 50 per cent. solution usually produces one mushy stool daily for several days. When this dose is ineffective, a larger one is no more successful. Indeed, a smaller dose occasionally acts even better than the amount mentioned. The treatment is indicated whenever laxatives cannot be swallowed (trismus), when the stomach rejects them, and when their administration by rectum is unavailing.

HORMONAL.—Zuelzer (*Deutsch med. Wochenschr.*, No. 26, 1912). The intravenous use of hormonal, as a peristaltic stimulant, has of late fallen somewhat into disrepute on account of the observation that alarming symptoms of collapse have followed its administration. Zuelzer, the originator of the treatment, who hitherto has strenuously denied the occurrence of the complication, now states that he too has recently observed it. The fact that the first reports of the treatment, involving some 4000 injections, did not mention this accident whereas recently it has been repeatedly reported, led him to infer that there must have been of late some change in the constitution of the drug as marketed. An investigation showed this to be a fact, and the toxic constituent was identified as an albumose. Zuelzer states that at present only albumose-free hormonal is marketed, and that all the older preparations, *i. e.*, those bearing a numeral less than 51, should be rejected. This new preparation is exceedingly active and entirely non-toxic.

The almost magical properties of hormonal, one or two injections of which often relieve obstinate and habitual constipation, when not obstructive in nature, may now, he states, be utilized by the practitioner without fear of danger.

———

THE TREATMENT OF SEVERE SCARLATINA WITH THE SERUM OF CONVALESCENTS.—Reiss and Jungmann (*Deutsch. Archiv. fuer klin. Med.*, Vol. 106, Nos. 1 and 2). In 10 severe cases of scarlet fever results were obtained, from the injection of convalescent serum, that may properly be termed specific. The dose is large, being 40 c.cm. for children and 100 c.cm. for adults. The serum is obtained from scarlet fever convalescents, late in the third or early in the fourth week of the disease, and the donor of the serum must be free from all disease except his scarlet fever. The serum must be bacteriologically sterile, and should represent a mixture of as many sera as possible, not less than three. It is clear that the treatment is possible only in a well-equipped hospital, and there only when scarlet fever is prevalent, since then only can a sufficient quantity of convalescent serum be obtained. The treatment is suitable only for very severe cases, but in these produces striking results. The serum should be injected intravenously and no later than the fourth day of the disease.

———

STATUS EPILEPTICUS.—Joedicke (*Deutsch. med. Wochenschr.*, No. 19, 1912). In 9 cases of status epilepticus with high fever, rapid pulse, and a constant succession of convulsive seizures, surprisingly prompt results were obtained from venesection followed by the intravenous injection of the following solution:—

R	Sodium chloride	9.0 gr.
	Sodium bicarbonate	
	Calcium chloride	
	Potassium chloride	ana 0.2
	Distilled water	1000.0

The writer's results lend support to the hypothesis that epilepsy is due to an intoxication, perhaps, according to Krainsky, with carbaminade of ammonia. The writer considers the most frequent cause of the status to be the abrupt withdrawal of bromides in epilepsy, and warns urgently against this error.

THE LOCAL TREATMENT OF EDEMA.—Pathault (*Jour. de Méd. et de Chir.,* June 10th, 1912). Great edema of the legs often resists obstinately all treatment, especially when the patient declines to permit the limbs to be incised. The writer has obtained good results from the local use of hypertonic saline solutions. A strongly hypertonic solution is used, containing 25 to 50 gr. sodium chloride to the litre of distilled water. Gauze compresses are lightly soaked in this fluid and are wrapped round the legs. A thick layer of absorbent cotton is placed over the compresses and the whole held in place by bandages. If the dressing be left on all night, the cotton will be found next morning soaked with fluid, and often the sheets and mattress, too, will be wet. The reduction of the edema is correspondingly marked.

Pathault thinks the process is one of osmosis, the hypertonic saline solution attracting the water directly through the skin. He admits that there are certain difficulties in the way of this hypothesis, but maintains that the facts are beyond dispute. Constitutional treatment must of course not be neglected, or the anasarca will promptly reform. Equally good results were obtained in all edemas whether due to broken compensation, Bright's disease, sclerosis or nearly cured phlebitis.

———

REMINERALIZATION IN TUBERCULOSIS.—Robin ("Traitement de la Tuberculose," Vigot, Paris). Robin holds that an adequate supply of mineral substances is essential to the successful treatment of tuberculosis and that no therapeutic method is adequate which neglects this indispensable factor. He suggests the following formula:—

℞	Freshly powdered bone	1.0	gr.
	Precipitated chalk	0.4	
	Magnesium carbonate	0.1	
	Milk sugar	1.0	
	Calcium fluoride	0.01	
	Calcium silicate	0.03	

Give this quantity twice daily after meals. If the stomach proves intolerant to this mixture, the amount of the two last ingredients may be reduced and 0.5 gr. of sodium bicarbonate substituted.

———

AN IMPROVED DIAZO-REACTION.—Feri (*Wien. klin. Wochenschr.,* No. 24, 1912). Feri's modification of the test consists in the use of a single reagent, marketed under the name of "asophorroth P. N.," instead of the fresh mixture of sulphanilic acid and sodium nitrite, as recommended by Ehrlich. The method is simpler and the reagent permanent. A trace of the latter is shaken up with a little water in a test-tube, and a few drops of the urine, made alkaline with sodium hydrate, are added. A brilliant red color marks the positive reaction.

CORRESPONDENCE

LONDON LETTER.

By F. C. Crookshank, M. D. Lond., M. R. C. P.

The annual meeting of the British Medical Association, which this year was held at Liverpool, under the genial and robust presidency of Sir James Barr, has come and gone; but, in spite of the approach of the holiday season, the proceedings are still the main topic for discussion in professional circles and coteries. This year unusual public interest has attached to the deliberations of what is known as the Representative Meeting, owing to the fact that on that body rested the onus of deciding whether negotiations with the Chancellor of the Exchequer, on the terms of medical service under the Insurance Act, should be continued or broken off. Well, the die has been cast, and the negotiations are at an end. The position then is this, that it is necessary for the Government to ascertain if arrangements can be made, independently of the Association, for a medical service on the terms which the Association has rejected, and to decide on a plan of action in case they are unable to make such arrangements. On the other hand, the Association calls on all medical men to refrain from accepting any post under the Act, except in connection with what we call "sanatorium benefit." A position of great delicacy and difficulty has thus been reached; each side professes itself confident of victory, and of course a certain amount of political feeling is displayed. But amongst the doctors there are those who think that the Association was weak in the conduct of the earlier stages of the negotiations, and has been unwisely rigid of late. The details of the contest are not easy, perhaps, to follow unless one happens to be familiar with the shifting sands of political and professional life in this country; but the occasion is one of the greatest gravity, and the issue must affect for generations the status of the medical men in the United Kingdom. It can hardly fail to influence the relations between the State and the profession throughout the world, and this must be my apology for bringing the subject before the notice of readers of this Journal. But, in spite of the almost overwhelming predominance of this great issue, much scientific work was done. Two addresses—that in Surgery by Mr. Paul, and that in Medicine by Dr. Gibson—merit careful perusal. Mr. Paul, who is of course the distinguished Liverpool surgeon, confined his remarks to that branch with which his name is so notably associated—the surgery of the large bowel. His remarks on cancer of the large bowel were of particular weight, and he was drawing on the treasures of a vast experience when he declared his belief that in some cases of cancer of the colon spontaneous cure may occur. He laid great stress, too, on the necessity for considering the variety

of carcinoma present in attempting a prognosis in these cases. He regards the infiltrating "colloid" type as most malignant; the "schirrous" hard form as only second to the "colloid"; and the soft fungating kind as the most favorable. This last variety Mr. Paul has seen most often in the cecum and rectum; but the colloid cancer affects the rectum, and the schirrous type the sigmoid flexure. Dr. Gibson, from Edinburgh, gave special attention to the effect of interaction between the various ductless glands, and did not fail to do due honor to the work of Cushing and other American investigators. But it is rather curious that, though Cushing's earlier work on the pituitary is widely known, his proof that genital dystrophy with obesity depends on interference with the posterior lobe of that organ does not seem to have attracted the attention that it should. A rather important announcement was made by Dr. Gibson of a forthcoming work by Ninian Bruce, in which attention will be directed to the persistence of chromaffine tissue cells in the midst of the sympathetic ganglia, in the accessory suprarenals, and in the so-called carotid bodies. Bruce appears moreover to agree with Kohn that these chromaffine cells, together with those of the adrenals themselves, are, embryologically, "twins" with the sympathetic ganglion cells.

In fact, it would seem as if that wonderful diagram given by Sajous in his book on the "Internal Secretions" is going to "come into its own"; and that the existence of what he called the adrenal system is going to be generally accepted. I am afraid that hitherto it has not been recognized quite as it should in this country; we have, perhaps, been a little shy of allowing the sympathetic nervous system its due place in the physiological hierarchy, at any rate of late years. Many other important papers were read, amongst them a delightful and critical address by Sir T. Clifford Allbutt, which may be referred to later; but these on which I have commented were the *pièces de résistance*. Another congress that has occupied much space in the newspapers has been that of the Eugenics Society. At the banquet that preceded the working days of the meeting, Mr. Balfour, our former Prime Minister, delivered a most charming and scholarly speech that rather, to use a slangy expression, "took the wind out of the sails" of the assembled philanthropists. For he, as a life-long student of science in the widest sense, pointed out that, if we accept Darwinism, we must agree that those who survive *are* the fittest to survive, or else they would all perish! We may perhaps think that the conditions that are now operating tend to select a very undesirable kind of "fit test," but that is another matter. It does not follow that we can be at all sure what are the conditions that would result in the natural selection of the type of person a Eugenist thinks the best, nor are we quite certain that even the selection of a Eugenist would necessarily be the best one in the interests of the race. Some very interesting notions from the point of view of the Eugenist were raised a few weeks ago by Prof. Karl Pearson, in his Cavendish Lecture, which is reviewed in the *Universal Medical Record* for July. Much good work is of course being done by the Eugenists, but we are a little diffident over taking action, even in the way of segregation. In fact, a bill now before the House of Commons to enable better care to be taken of the feeble-minded is meeting with considerable opposition from those who resent keenly what we call interference with the liberty of the subject. But still, we are moving; steadily, if slowly.

September 20th.

THE UNAUTHORIZED USE OF A PHYSICIAN'S NAME.

To the Editors of the Interstate Medical Journal.

Sirs,—Upon my return to the city, my attention was called to a circular letter sent out to physicians by a concern which styles itself The American Recipe Co. In this letter certain tablets, called aseptone tablets, are advertised, and my name is mentioned among those who prescribe these tablets in their daily practice, and who declare that in the employment of these tablets a long stride has been made in aseptic treatment. In connection with this circular letter, I desire to say:—

1. That the use of my name was not authorized by me; in fact, I knew nothing of the existence of the said concern.

2. That out of courtesy to the inventor of these tablets, I consented to give them a clinical trial.

3. That I employed said tablets in about half a dozen cases, but have abandoned them since June.

I trust that in justice to me, you will be good enough to print this letter in the next issue of your valued journal. I am, etc.,

GEORGE GELLHORN.

St. Louis, September 25th.

EDITORIAL.

WALKING ON ALL FOURS.

The re-education of mankind is in the air. No matter whither we turn, someone is at hand with a lesson that shall bring a measure of health and happiness to our shattered systems and perturbed minds. The eugenists are on the alert to rectify all past mistakes; the social reformers were never more blatant in their insistence to impress us with their theories; and quite a number of physicians have recently taken us in hand for the sake of telling us how sinful we have been in the matter of overdosing our systems, when the simplicity of a re-education of our various organs would be the means of doing away with all drugs!

Of all physicians the French are in the lead as reform educators of our organs; and, as is so often the case when perspicacious Frenchmen take a matter in hand, their teachings are not only more fascinating, but also more practical than those of distinguished men of other nationalities. Instead of working along the broad lines affected by English eugenists and attempting the re-education of man by one fell swoop, they are content to take one organ at a time, give it a curriculum that will show it its evil ways in the past and what its possibilities may be in the hierarchy of the educated, and, when this is effected, pass to another organ, thereby hoping, it is to be inferred, that when the education of all the organs is achieved, the eugenical condition of the individual will no longer be doubted. Could simplicity and practicality go further? and have we not here the real fulfilment of the enthusiastic eugenist's most colorful dream, without bothering as to whether you or your neighbor made the right selection as regards parentage? Verily, the French need no counterpart of Karl Pearson to lead them to the Promised Land!

The latest organ to receive re-education in French medical literature is

the stomach; and, though we have been rash enough to write the "latest," we may be altogether wrong in making this statement, since statistics are lacking, and from what we have read in French journals of the re-education of lesser organs, one would think that so important a member of the body as the receptacle of heterogeneous foods, "shoveled in," so to speak, in most indiscriminate fashion, would certainly before now be the object of modern enlightenment. But no matter whether or not the subject has been touched upon before, what Dr. Léon Meunier tells us, in his article "La Marche à quatre pattes" in the *Gazette Médicale De Paris* of September 4th, is new and novel enough to give us pause for considerable thinking. According to this educator, the best means to expedite "gastric evacuation" is to walk on all fours after a meal has been taken; for by radiographic and chemical experiments it has been made evident to him that only in that way is the stomach emptied with despatch. As Dr. Meunier feelingly expresses it: "In every case, these experiments confirmed Darwin's theory that primitive man, our simio-human ancestor, was a quadruped. According to Bell, little by little the change from quadruped to biped was effected, until finally the hand was developed, which, guided by the intelligence, gave to man his universal domination. But in the process of evolution, have the situation and function of the stomach adapted themselves sufficiently or insufficiently to the changed conditions? To ascertain this, radiographic and chemical experiments were brought into play, and what I suspected has been confirmed— namely, that in man digestion and evacuation of the stomach contents is much more rapid in the quadruped position than in the biped."

As was said before, the French do things in a much more simple and practical fashion than any other nation. But, though this might be considered a virtue in other matters, in the case of evolving the eugenical man or woman, the progress of the historic snail—and surely the re-education of each of our organs necessarily takes a long time—is hardly to be encouraged. Still, let us not delude ourselves with the thought that just because our prescience was beautifully developed in the matter of selecting parents with sound organs, this must mean for us the same quota of health, and that re-education, slow though the process may appear at sight, will not bear better fruit than some of the visionary maunderings of a dyed-in-the-wool eugenist. Of course, walking on all fours may crush our spirituality and increase our animality, but what of that so long as the right education is bestowed on an organ that shows a rebellious spirit directly something is put into it that does not conform with its own peculiar (?) ideas of digestion. Better, indeed, is the French method of striving toward a eugenical state than some of the

theories put forth by really intellectual men at the first International Eugenics Congress in London in July, when quite a number of the supposedly weighty remarks could only be met by what an English critic recently said in regard to a Futurist painting—namely, that it appeared to him to be "a Friday afternoon developing into a pair of trousers."

THE ONLY CHILD.

Before the dawn of the scientific mind—that is, before it became the universal note in modern society—a number of subjects, which are at present expounded medically, were left to writers of *belles-lettres* to do with them what they saw fit, so that an eager, or was it an indifferent public, should at least know that the province of "light" literature was not averse from considering them. Who has not pored over the novels of the seventies and early eighties of the last century, and envied, for instance, the only son or the only daughter who had servants at their beck and call, a doting mother, a father whose one interest in life was to see his child "well placed" in the world, a garrulous and self-sacrificing nurse who would to-day be considered by all Shavians a general nuisance, but who, at that far-distant time, was an appanage without which no novel was "artistic," and a general coddling, so that a hero or heroine could be produced who would make every reader of grubby hands and unrefined and lowly thoughts lie awake at night in a fever of excitement and miserable humiliation. A case in point that may be mentioned here with emphasis was that insufferable little bore, Lord Fauntleroy, who, in his velvet smalls, his immaculate linen shirt, his red sashes, minced, not only across the pages of Mrs. Burnett's novel, but affronted us behind the footlights with his small wit, his mature thoughts, and his grotesque attitudinizings. But did his harshest critic ever think that, on account of his being the only child, he was laying a very good foundation for being later on a neurotic, a victim of homosexuality, psychic impotence, sexual anesthesia or dementia præcox; or was there even one solitary shamfaced thought that the red sash, the black velvet, the "sweet," solemn, and asinine philosophy portended a reversal of clean sexuality? No, there was not; but, as has been said before, in those days we were not scientific, at least we allowed literary characters to assault our intelligence without demur, and swallowed many a crass bit of philosophy without so much as wincing. But, other times, other manners; and, if we are to believe what Dr. A. A. Brill has told us in his paper "The Only or Favorite Child in Adult Life" in the *New York State Journal*

of Medicine for August, our "scientific" ideas were strangely awry in the seventies and eighties in the presence of the velveted imitators of Mrs. Burnett's creation,—who can forget the vast army that followed in its wake?—for among them there surely was a large percentage of only children who, had they or their parents been warned in time, would not to-day be sexual derelicts in a society that needs pure men and women.

Thus it can readily be seen that the only child, as judged from the present-day point of view, deserves our pity, our commiseration, instead of our envy; and though the statistics, as given by Dr. Brill, may be somewhat exaggerated, due, perhaps, to an exuberance that necessarily inheres in all medical discoverers, the facts cry out against the only child. In short, like all heroes, who have occupied the pedestal of popular acclaim for too long a time, his end is approaching unless the coddling he is wont to receive from parents and public ceases, and a manliness is taught him, not only by a complete withdrawal of adulation, but the right induction into the rather brutal sports and uncouth behavior of other boys; or, in case the unfortunate product is a girl, unless harsh lessons are taught her by other little girls so as to deprive her of her exaggerated ego. If we have studied the temper of the boy of, say, several brothers and sisters aright in his attitude toward the only child in his neighborhood who regards himself as a magnificent animal just because his parents are of this opinion, it will not require much encouragement from any outsider to make him pounce on the aggravating offender to the destruction of his fine feathers and his sublime superiority. And though Dr. Brill is apparently too mild-mannered to advocate the extreme measure which we have advanced, we are nevertheless much more enamored of it than of his plea that an excellent corrective would be "a few weeks' attendance in a kindergarten or public school." Unfortunately, the children of many brothers and sisters do not read medical journals at the present time; hence, their ignorance of what they might do as social missionaries will continue until some far-seeing writer of "popular" medical books will bring home to them, in the simple language of the "popular" writer, their real mission here on earth. Then, no doubt, there will be many bloody noses; but, if the blood washes the little egoists clean of their moral stains, should we not all rejoice that the ranks of the sexual perverts will be considerably thinned?

OPINION AND CRITICISM.

_____

A NOTABLE BIOGRAPHY.

The excellence of a biography can be defined in various ways: it is above the average because it is well written, it is of interest on account of the personal note, it tells a story that is new and refreshing, it holds the reader's attention because the subject is of moment and the biographer a writer of parts. These remarks all of us have heard from time to time, but despite their repetition and the arguments for and against, no agreement among the true lovers of biography has been reached. Yet, though this is true and on first thought we may be very much at sea as to what constitutes the genuine example of biographical writing, if we will but pause long enough to remember two points, at least a partial agreement may be effected. And these two points, we are happy to say, are the cardinal ones in Dr. Jesse S. Myer's "Life and Letters of Dr. William Beaumont" (C. V. Mosby Company, St. Louis), for in every chapter the importance of the subject is brought home to us, and the writer's manner of handling it is declarative of a delightful reticence that shows an unwillingness to dwarf it by supererogatory attempts at writing "brilliantly." It is only too often the case, in biography written nowadays, that the writer obtrudes himself too much on the reader's notice, thereby hoping to achieve an end which will sustain his amour-propre, no matter how much the subject in hand suffers. No such charge can be made against Dr. Myer, since in his treatment of the career of Dr. Beaumont he is ever the sympathetic bystander who through patience and kindliness allows his subject to unfold the story of his life by means of his letters and journals. But this does not mean that the author's notes and annotations are of secondary importance; that without them the reader would be just as well off; that they are merely sandwiched between letters and excerpts from private journals for the sake of padding. On the contrary, they are apposite and very well written, and are such an interesting link in the biography that unstinted praise should be meted out to them.

Those among us—and we imagine the number is quite large—who merely know that once upon a time such a book as "Experiments and Observations on the Gastric Juice and the Physiology of Digestion" was written, without ever having read it or aware what the book stands for in the province of physiology, should not fail to read this intimate and sympathetic study of its author; ·for not only will they form the acquaintance of an unusual man, but they will be brought into close rela-

tion with the stirring times in which he lived. But, even more than this, the great lesson which will be taught them will be the one which all men should learn—namely, that it is only through patience and close observation that a great discovery can be made.

———

UNIVERSITY EXTENSION MEDICAL WORK.

The recent course given at Fordham University, New York City, has exemplified what is possible of accomplishment in this direction; for though the Medical Department of Fordham is a fledgling beside many university medical schools in this country, it did not hesitate to try out its wings in a very ambitious project that landed it safely with honor crowning its efforts.

The course was suggested and largely planned by Dr. W. J. M. A. Maloney, the talented neurologist whose services Fordham has been fortunate in securing; and his efforts, supported by those of Dr. Smith Ely Jelliffe and others, were largely responsible for the success of the enterprise.

The foreign lecturers secured were Henry Head and Gordon Holmes, of London, whose sensory and topographical work has attracted the admiring attention of the neurological world, Dr. Achucarro, the colleague of Ramon y Cajal, of Madrid, Dr. Karl Jung, of Zurich, the leading exponent after Freud of psychoanalysis, Prof. Knauer, of Munich, whose work in Kræpelin's clinic has attracted favorable comment.

While there were some very definitely weak spots in the course, it was, taken altogether, a very well carried out review of the present-day knowledge of neurology and psychiatry, as far as was possible in three weeks of lectures and demonstrations.

It was much more systematic than the usual post-graduate clinics undertaken by several colleges in this country. And, confined to one subject, it took the form of the intensive method now popular in some of the Eastern schools.

Next year an extension course will cover the field of the internal secretions. A different group of students will be attracted, but the same focusing on one line of problems, one department of medicine, will occur.

The vastness of the general field of medicine requires intensive cultivation of relatively small areas by students, whose tastes lead them to selective study; and we believe extension work will meet with greater success if courses are confined to one field. Fordham has, at least, shown the feasibility of this plan; and we shall watch with interest for other experiments elsewhere in the country.

Teaching is not possible for all—even very able practitioners may be very poor teachers. The ability to teach is a natural gift reinforced by careful training in the art. In any intensive course, great care should

be taken not to pad the schedule with dull instructors, however estimable they may be personally. When one concentrates his attention for eight or nine hours daily upon the various aspects of one subject, he needs all the cleverness of the skilled pedagogue to keep his faculties alert.

LITERARY NOTES.

The quality of a book is so often overlooked nowadays by the careless reader, who fails to distinguish between quality and quantity, that it would seem right and proper that when a book has the former at the expense of the latter, the fact should be set forth in no garbled words. A case in point is the booklet "Some Recently Discovered Letters of William Harvey with Other Miscellanea" by Dr. S. Weir Mitchell (Transactions of the College of Physicians of Philadelphia), which is of so fine a quality that all students of Harvey must rejoice, not only because of the "Letters," so long a buried treasure, but because the editor is Dr. Mitchell than whom no better literary executor could have been found in this country. The lives of some great men are of perennial interest, for the reason that hardly a decade passes but some discovery is made as to their literary remains; and, in respect of Harvey, the annual addresses before Harveian Societies—and those delivered in England are not without some new points—would indicate that even within less than a decade, new and important matters are unearthed to add zest to our interest in his life. Fortunate, indeed, is the man whose fame is kept a-glow by posthumous "findings"; and even when the material is less interesting than that which is contained in this volume, the gain to his reputation as a world figure is a decided one. The "Letters" now published are all of interest, and, similar to every effort in the life of a distinguished man for which he does not pose before the public, have all the charm of unaffectedness. To give the reader an idea of what we mean, one quotation should suffice, since it shows that though Harvey would not have objected to one of his own patients being quarantined at Treviso, in fact would have seconded the Italian health authorities in the performance of their high functions, when a like annoyance was visited upon him great was his wrath. To illustrate: "1636. Aug. 3-13. Treviso.—My sweete lord [Lord Feilding], I came this morning to the gates of Treviso with great joy, and hoped this night to have had the happiness to have beene with you att Venise, butt I have receyved heare a very unjust affront, being stayed and commanded by this podesta to have gone into the Lazaretto, without any cause or suspition alledged. I took my first *fede* [*fede di sanita* or certificate of health] under the seale of Ratisbone, a place free, and now destined, as your Eccelency knoweth, for the meeting of the Emperor and all the rest of the princes, which yf it had not beene soe,

they would not have com thither, it being infected or suspected. Since, in every place as I came, I caused my *fede* to be underwritten, so that there is no ground for them to say any suspition upon me. And att this sentence on me by the podesta (that I should goe to the Lazarett) I absolutely refused, and sayd and offered to shewe that I had the pass and recommendation of his Majesty the King of Great Brittain and of the Emperors Majesty and of my lord Embassador his Eccelency, and that I had to goe to princes and men of quality, and that my busynes required expedition, and desier'd they would not hinder me, butt, as my passes required, further me and that I mought not bring that suspition and infamy on me, besides my own security, to goe to such a place as Lazaretto, whear they use to putt infected persons, and that I had shewed them sufficient *fede*. Notwithstanding all this, heare I am to lye for ought I see in the open base feilds, God knows how long. The podesta refuseth to see or reade my passes, and I cannot cum att him to speake and use my reasons. I am afraid this lying in the feild will doe me hurt in health. I beseech your Eccelency to lament hereof. It is unjust to proceed with any man thus without cause and otherwise then Venetians are used in Ingland or soe merrit to be used heare, and otherwise then is fitting for the respects ther shold be used to the passes forenamed.

"I pray pardon this scribling on the grass in the feild, and procure with all expedition my freedom from this barbarous usadg. Your distressed frend and humble servant of your Eccelency."

———

"The Doctor and the People" by H. De Carle Woodcock (Methuen and Company, London) is peculiar in this that unlike most books of the better sort—those which are apparently logical and have some literary pretensions—the message is not direct enough so that the reader of intelligence can grasp it without difficulty. A great deal is said about the advance medicine has made in recent years and the benefits that have accrued to the public on account of this, about the leading lights in the profession—their successes as practitioners, as lecturers, as figures in society, about Mr. Lloyd George and the Insurance Act, tuberculosis and cancer, and doctors described in works of fiction; but though all this is done with considerable cleverness, the author's floundering is always evident. Only once throughout his book does he take a positive stand and that is when he attempts to restore the general practitioner to the place from which, in these latter days, he has been somewhat crowded out by the surgeon. But even then the reader will feel that Dr. Woodcock has not complete mastery of the reins, is a bit afraid to lash with a whip that will sting. After reading this lukewarm exposition of a most interesting subject, the writer of these

lines thought how unfortunate it was that the author did not have just one iota of Mr. Bernard Shaw's directness of speech and of his irony and wit; and how much more logical and more clearly stated were Mr. Shaw's arguments on the doctor and the people in his Preface to "The Doctor's Dilemma," even though at times there was a sacrifice to extravagance for the sake of scoring. We take it Dr. Woodcock is no amateur at writing; his book confirms this opinion. But despite his practised hand, he has not written well in the sense of surety and that degree of audacity which must inhere in all writings on the much-discussed subject of the doctor and the people, if a new thrill is to be imparted to the reader.

———

While it would be most unjust to the author of "Sex Education" (Duffield and Company, New York) to say that his book lacks candor and sincerity, a critic, who has recently been "swamped" with so-called "popular" books on sex education, would be more or less justified in crying "Hold, enough," since it is a fact beyond dispute that the literature on this subject is so overwhelmingly extensive that repetition has become its hall-mark. According to the majority of the writers, whether medical or lay, on the sex question as expounded in the books under consideration, the important message to parents, and through them to their offspring, seems to be a thorough ventilation of the subject; and though candor, in such circumstances, must be conceded as admirable, is it not possible that a gloomy and suspicious parent may become a fanatic Puritan, "a prude on the prowl," and his children the opposite of moral cleanliness, just because too many lessons are taught them, too much advice is given, too many suggestions are thrown out to keep them from harm? When it so happens that a parent wishes to inculcate the love of books in his child, he surrounds his child, provided he is a sensible man, with books that are worth while; when his desire is that his child should develop a taste for music, for art, for mathematics, he sees to it that the immature mind has opportunities to imbibe at its own will, and, if this process is too slow, kindly suggests new avenues to further his wish. But does he suspect stupidity, insubordination, sheer stubbornness, before the test is made, does he attribute to the child a deplorable perversity because its mental grasp lies in other directions? The old-fashioned father, who thought he could not be a good father without being an educator, may have done this; but would a modern father do the like? And yet, in the large majority of the books on sex education, the old-fashionedness of the educator prevails; and just because he thinks that every child, to paraphrase the Gilbertian phrase about a little Liberal or a little Conservative, is either a little sexual pervert or a little brute steeped in sensuality, he uses the ferule to flay the parents so that they

in turn may flay their children! But is this understanding the psychology of the child, is this the right and proper attitude of the modern educator? To throw pell-mell into the minds of so-called educated parents the lurid warnings that obtain in the majority of these books, has about the same practical value as to take these same parents ruthlessly out of their daily, and rather humdrum, walk of life and insist upon their being something foreign to their natures.

———

As illustrative of the fact that very few medical men, at least in this country, are sufficiently equipped to write well-constructed novels or plays is Dr. G. Frank Lydston's "The Blood of the Fathers," recently published by the Riverton Press, Chicago. And bearing this in mind a critic should not be too harsh in his judgment. But even remembering how short of the literary sense the majority of medical seekers of literary glories are, this play is so decidedly crude and bombastic and portentous that the tempering, which should be an important factor in a criticism of a doctor's literary flights, must be withdrawn. The materials used are so ancient, the characterizations so puerile, that he must be an obtuse reader of ephemeral novels or an incurable admirer of lurid and heavy melodramatics not to see at once *deus ex machina* in all the scenes. That the play is serious no one can gainsay; but even admitting that we are so frivolous to-day that a reprimand, in the shape of a play fairly dripping with "science," is not inopportune, are we really as careless about "our blood" as Dr. Lydston make us out to be? Brieux has told us a bit about our shortcomings and so has Strindberg, and while we winced under their lashes we could not help but say that they were right. But their lashings were pleasant "ticklers" compared to what is contained in this play; but then it must not be forgotten that they were mere literary men with no knowledge of "science." Now, while the play is disappointing, the Preface, Persons of the Play, Description of the Persons of the Play, and Costumes are illuminating, especially the latter, for there we read that when Dr. Allyn was a struggling physician, with much science and no money, "in lower Third Avenue, New York," he was "plainly dressed in a dark business sack suit, turn-down collar and dark four-in-hand tie. His hat was the conventional black derby, his gloves were dark brown and his overcoat a dark grey. His shoes were black," but directly he opened offices in Fifth Avenue he affected "a dark brown velvet lounging jacket, dark vest and trousers, fashionable standing collar, white four-in-hand tie and enameled leather shoes." That a "fashionable standing collar and a white four-in-hand" are the insignia of being fashionable and prosperous is a new chapter in haberdashery.

ORIGINAL ARTICLES.

THE MALARIA PROBLEM, WITH SPECIAL REFERENCE TO EDUCATION AND DIAGNOSIS.

By Thomas W. Jackson, M. D., of Manila, P. I.

At the recent annual meeting of the American Society of Tropical Medicine, at Atlantic City, June 3rd, 1912, the retiring President, Dr. J. H. White, in his valedictory address dwelt upon the necessity for educating the public in matters pertaining to malarial causation and prevention, and he referred to the necessity for obtaining more accurate statistical information regarding the true prevalence of malaria in the United States.

The fact that the reports of health boards are woefully inaccurate, even in those communities where malaria is reportable, is well known by all who study this important and preventable disease. The writer has previously called attention to this unfortunate state of affairs, in his lectures to the senior classes at the Jefferson Medical College (1906 and 1907), as have many other teachers throughout the United States. The consideration of the reported number of deaths from malaria as a criterion of the prevalence of malarial infection is worthless for several reasons. The first reason is that, in the average community, deaths from malaria are not proved by microscopic blood examinations. So long as the symptomatic diagnosis is accepted this must be so, and the death reports will remain as worthless as the sick reports. Again, it has been shown conclusively that latency of infection is so common in our own Southern states, as well as in the tropics, that even if every febrile case of malaria sufficiently severe to require the attendance of a physician was reported, a greater number of latent cases, perfectly capable of propagating the infection, would still escape report.

Education is truly the great prerequisite to success in antimalarial campaigns, and this education must begin within the ranks of our profession.

It is common enough in the writer's experience to have his emphatic statement, "malaria is mosquito-borne and solely transmitted in this way," met by his patient with a sceptical smile, and it is also a common experience to have his injunctions concerning mosquito exclusion disregarded. He has even had a patient inform him, and this recently, that

her family physician insisted that there are plenty of other ways in which malaria may be acquired. The family physician is a reputable practitioner, of middle age, in Washington, D. C.

The writer can truthfully say, as he said five years ago,* that a general campaign of education of the laity (and of such benighted members of the medical profession as the individual just referred to) is the most promising measure of prophylaxis at our command. The lack of understanding of the manner in which malaria is acquired and of the practical possibility of abolishing it through anti-mosquito measures, and occasionally, perhaps, through general prophylactic drug administration (quinine), is our greatest obstacle to achievement. Manson truly states that "sanitary measures can rarely be carried out effectually unless the rationale of their operation is understood."

Public health officials in malarial districts should indoctrinate the people in every possible way with the belief that mosquitoes and malaria are allied afflictions, and that both are preventable.

State boards of health are taking notice of these facts, and the recent creation of a Malaria Commission, headed by Dr. C. F. Craig, an eminent student of the disease, is a matter for congratulation to all who are awake to the needs and possibilities in the suppression of malaria.

There is no good reason why tuberculosis, syphilis, pellagra and hookworm infection should crowd from the public stage the one disease which is most naturally and rationally preventable, accurately diagnosable, and specifically curable. Moreover, none of these diseases is more ancient and time-honored, or more capable of impressing and depressing the national life and character by its blighting effects upon childhood, than malaria.

Let us see to it that the Malaria Commission has our support, and let us see, too, that all of the public effort and money are not expended upon other and less controllable diseases.

In our local communities, as practising physicians and good citizens, and in our local and state medical societies, through the politico-social influence we are able to exert, we are bound to support this movement.

Sanitary surveys for malaria in infected regions should be carried out, and systematic blood-search of the inhabitants, especially the children, of communities reputed to be malarious, with the study and classification of the mosquitoes of the localities, should be part of the work undertaken in the campaign. Having obtained the desired data, efforts to cure the infected populace and to suppress the malaria-carrying mosquitoes should naturally follow.

Some years ago Celli and Casagrandi stated that the problem of mosquito destruction, while experimentally solvable, would only be practically so when economic interest desired it.

The accuracy of this prediction has been verified by our course of action in the Panama Canal Zone, and in Havana during the period of our

---

*Jackson: "Tropical Medicine," p. 256.

occupation of that city. It will be admitted that economic interest was not the least potent factor in bringing about the sanitation of these ancient pest-holes. Let the public at home but understand the importance of malaria suppression in the United States from an economic point of view, and, with a knowledge of the causation of the disease, both desire and demand for mosquito destruction will arise throughout the land. Naturally, the propaganda will require years, and the education of the public is the first and most important step. Craig* recently called attention to the fact that practically nothing has been done in the United States to determine the actual amount of latent malaria in that country. The preparation of maps demarking the distribution of anophelines and malarial localities, as determined by actual systematic blood-search, will be a feature of the work, both interesting and helpful. Already some of our Southern states have shown a commendable interest and have inaugurated the actual work, while some of the larger and more populous of the Northern states, Pennsylvania for example, have undertaken to provide more reliable statistics by encouraging accurate microscopic diagnosis and by making malaria a notifiable disease.

It is not proposed to introduce the steps and details relating to malaria prevention into this paper. In addition to the education of the public as to the manner in which malaria is transmitted, there are the matters of (1) mosquito control and destruction, and (2) the management and cure of infected persons. The last named matter is purely a medical problem and a most important one. It is hardly realized that "malaria carriers" in infected communities are principally responsible for continuing the disease in a community from season to season, just as cholera carriers in the Philippines and typhoid carriers in the United States perpetuate these diseases by furnishing new infecting material.

As two known factors are necessary in propagating malaria: the anopheles mosquito and the plasmodium of malaria—one existing outside the human body, the other within the human circulation—we have two avenues of attack. As medical men, however, we have no choice as to which avenue we will make use of. Our obvious duty is to cure our cases by destroying all the malaria parasites, which circulate in the human blood, and by so doing to make them non-infective to mosquitoes. This is a perfectly feasible plan, but unfortunately it fails in thousands of cases annually through the neglect of physicians to apply adequate treatment over periods of time sufficiently long to insure actual rather than symptomatic cures. The writer will not dwell longer in this paper, however, upon this phase of our work, but will pass to a brief consideration of a feature which is, in his opinion, second to none in importance— the diagnosis of malaria.

Although thirty-two years have passed since Laveran, then an obscure French Army surgeon stationed in Constantine, Algiers, observed and described the appearance of parasites of malaria in the human blood,

*C. F. Craig (*Southern Medical Journal*, December, 1910).

it is hardly more than half that length of time since the confirmation of his discoveries—the classification of the parasites and the development of a technique for their study and demonstration—placed in our hands a rational and practical method of diagnosis.

That this method is not universally practised to-day is one of the strange things of modern medicine. Complicated biological and serological methods of diagnosis are practised generally in the determination of many of the infectious diseases.

Medical men everywhere make use of the Wassermann and Widal tests; and cultural and indirect microscopic methods are practised in the diagnosis of diphtheria, tuberculosis and other common infections, while the direct microscopic diagnosis of malaria is made with comparative infrequency. To illustrate: During the year 1909, in a large laboratory connected with a metropolitan hospital, where more than 20,000 new patients from all corners of the globe were treated, and where a special feature is made of the teaching of malaria, but 58 of 12,000 laboratory examinations made (about 4/10 of 1 per cent.) were blood examinations for malaria. This is something of an index of the failure of physicians generally to make use of the most direct and infallible diagnostic procedure in medicine. Excepting hospital and dispensary practice, it will be found that blood-searches for malaria parasites are even less frequently made.

Last autumn the writer saw a patient suffering with estivo-autumnal (malignant tertian) malaria, his blood loaded with ring-forms and crescents, who had been under treatment for typhoid fever for three weeks. But for the establishment of a diagnosis by means of the microscope, this life would probably have been lost. The writer is perfectly aware of the fact that in most communities the more frequent error is the reverse of this one—namely, that of mistaking typhoid fever for malarial fever. The point which it is sought to emphasize, however, is that both mistakes are inexcusable with the diagnostic measures at our command.

The writer cannot now discuss the difficulties and obstacles to microscopic diagnosis. He would be glad, however, to recall any impression which he may have given at any time to the effect that microscopic diagnosis is childishly easy or can be successfully employed without special training. Every year he becomes more impressed with the opinion that it is a procedure calling for special skill and intelligence as well as practice. Nevertheless, there should be no community without some medical man or men instructed and trained to recognize the parasites of malaria and to make differential white cell-counts. In general, the writer would say, all internists should be specially trained in this respect. When stained blood-smears are used—and he favors their constant use—the two procedures may be done at one time. In the event of a negative finding in examining for parasites, a suggestive differential count, made at the time from the same stained smear, will usually guide you safely as to future search, provided that the smear be taken at an afebrile period of the

disease. Of course, quinine must be withheld prior to examination; and, if a negative result with a suggestive white-cell count is found, the drug must be withheld until after the second examination. A placebo may usually be safely substituted. In the presence of pernicious symptoms we will have to be content to secure our specimens, and then give quinine upon suspicion, examining the smears at the first opportunity.

The necessary steps are blood collection, staining and examination; and, besides a proper microscope with an oil-immersion objective, very little apparatus is necessary—namely, a suitable needle, glass slides, a wax pencil or a piece of paraffine, a small bottle of Wright's stain, one of distilled water and a medicine dropper. The office or kitchen sink and a table at a window complete the necessary laboratory outfit. Search should not be made immediately after or at the height of a paroxysm, as the beginner will probably fail to find parasites then, whereas in six or twelve hours he will easily do so.

The writer is not ignorant of the fact that some communities are free from malaria. Wherever anopheles mosquitoes are not to be found, we may feel sure that malaria is always an imported disease; but Dr. Clara Ludlow* recently called attention anew to the fact that anophelines are frequently present and escape discovery for long periods, owing to their furtive habits and their ability to escape notice, citing instances in point where the continued occurrence of malaria led to repeated and more careful and successful search for anophelines. The writer knows from experience in malarious districts that they are most elusive and frequently escape detection, meanwhile carrying on their nocturnal deviltry.

The writer does not feel at liberty utterly to condemn symptomatic diagnosis. It served us for many years and doubtless will continue to be the popular method in certain localities and sections for years to come. The classic symptoms of tertian ague were well known to our great-grandmothers, and called forth more or less appropriate treatment with cinchona preparations, empiric to be sure, but time-tested. It is now time for us to abandon our grandmothers' conceptions of "chills and fever" and their symptomatic cures with a few doses of quinine or "bark," and to regard malarial disease as a serious systemic infection to be treated rationally, in the light of our knowledge of its parasitic cause and its insect and human carriers.

If we so consider it we will be unwilling to get along without microscopic diagnosis, and we will learn to postulate our cures, following treatment, upon the permanent disappearance of the parasites.

The writer is conscious of the incompleteness of this discussion. Owing to limited space he is unable to touch upon other important aspects of the malaria question, but he entertains the hope that some little good may come from calling attention to the educational side of prophylaxis and the importance of diagnosis.

*The Military Surgeon, July, 1912.

THE TREATMENT OF HEMORRHAGIC CONDITIONS WITH NORMAL HUMAN BLOOD-SERUM.

By Louis A. Levison, M. D., of Toledo.

Despite the publication of a number of articles on this subject, this paper has its justification in the fact that the method is not used except in comparatively isolated cases. A therapeutic measure which seems to be veritably life-saving should have the widest publicity. The writer has personal knowledge of several cases of hemorrhage in the newborn, which have ended fatally after the physician in charge, without knowledge of serum therapy, had exhausted the feeble armamentarium of styptics, gelatine, and calcium. The use of blood-serum to control hemorrhages is purely empirical. Its value has been proved in such widely differing conditions that the good results may not be entirely symptomatic.

Hemorrhage as a symptom occurs in innumerable diseases and conditions. The list includes hemophilia, hemorrhage of the newborn, the various purpuras, sometimes classified as acute, chronic, simple, rheumatic, senile and idiopathic, Winckel's disease, Buhl's disease, malignant disease, jaundice, anemias, grave infections as measles, scarlet fever, diphtheria, variola, typhoid, scurvy, morbus maculosis Werlhoffii, nephritis, congenital stenosis of bile-ducts, cirrhosis of the liver, leukemia, pseudoleukemia, syphilis, and toxic states. Many types of disease are included in the above list. In many of them hemorrhage, occurring with varying frequency, is not a part of the usual disease picture.

The term hemorrhagic disease of childhood includes a number of diseases and conditions in which the hemorrhage dominates the picture. It is with this class of diseases more particularly that the writer has to deal. It includes hemorrhagic neonatorum, hemophilia, Buhl's disease, and Winckel's disease. A pure hemophilia is to be sharply differentiated from the remaining member of this group by its non-septic nature. Hemophilia is always suggested as the cause of hemorrhage of the newborn. The bleeding of true hemophilia rarely begins early in life and the hemorrhage in these early cases is seldom fatal. Hemophilia is an inherited, constitutional anomaly, nearly always affecting males and is transmitted through healthy women. There is a sporadic, accidental type of hemophilia, which is probably not inherited, occurring later in life than the usual type, appearing either spontaneously or following injury, and affecting both sexes.

Hemophilia is the only member of this group which is a clear-cut clinical entity. The remaining conditions have been classified on purely

clinical grounds. There is no doubt that a solution of the pathological physiology and the bacteriology of these conditions would make a new and correct alignment.

The hemorrhagic diseases of childhood, not including hemophilia, all show febrile symptoms. Cyanosis, icterus, and hemorrhages are variably present. The hemorrhages may be multiple or single. Finkelstein makes this a basis for another classification of hemorrhagic disease. Buhl's disease and Winckel's disease are both characterized by multiple hemorrhages. Fever is generally absent in Buhl's disease and present in Winckel's disease. The latter may occur in epidemics. A classification based on the multiplicity of the hemorrhages is very unsatisfactory. It is not uncommon in early life to see hemorrhages from a single point— umbilical, intestinal, more rarely vaginal, which may or may not go on to multiple hemorrhages. Early and efficient treatment may check a single hemorrhage that would have advanced to a well-developed case of hemorrhagic disease. Syphilis is said to cause single hemorrhages, but in the absence of localized ulcerations causing hemorrhages, such as a rhinitis, this statement is not justified. Not until we are able to determine the etiological factors in these cases should we adopt such dogmatism. Syphilitic children are susceptible to the same etiological factors as are healthy children, and our present crude methods do not always permit of a satisfactory dissociation.

The etiology of the hemorrhagic diseases of childhood is still an open subject. Many theories have been advanced to explain the hemorrhages in hemophilia: rupture of the blood-vessels following on abnormal thinness of the vessel-walls, high blood-pressure, disproportion between the total amount of blood and the capacity of the vascular system, and various abnormalities in the blood chemistry. It is not probable that infection plays any rôle in the causation of the hemorrhages of hemophilia. The remaining members of the group of hemorrhagic diseases of childhood show an infectious factor. A great many investigators have found varying bacteriological findings, and it is not possible to agree on a common bacterial cause. The belief is generally held that a number of different organisms may produce these hemorrhagic diseases. Babes[1] found a "bacillus of hemorrhagic disease," but this has not been confirmed. Kamen has reported a bacillus found in an epidemic of Winckel's disease. Klebs found a micrococcus in the urine of an infant dead from hemorrhage, and was able to produce hemorrhages in rabbits after inoculation with this organism. This was corroborated by Weigert, and by Eppinger. Streptococci have been found by Baginsky,[2] Babes, Bar, Strelitz;[3] staphylococci and the bacillus pyocyaneus by Neumann[4] and Finkelstein;[5] the pneumococcus by Babes, the colon bacillus by Wolzynski,[6] Hamill and Nicholson,[7] and Kamen. Unidentified bacilli have been found by Gaertner[8] and Strelitz. Many of these investigators have produced hemorrhages in animals after inoculation. There are well-

grounded reasons for suspecting bacterial infections to be the cause of hemorrhages—the occasional epidemicity, the micro-organisms found in the blood and at autopsy, the results after inoculations, and the pathological condition of the tissues.

The etiological problem has also been attacked from another side. It has been pointed out that there are certain clinical features and pathological conditions common to all the hemorrhages of childhood. Cyanosis, edema, icterus, fatty changes in the viscera, gastro-intestinal symptoms, and hemorrhages are as a rule present. These conditions are found to a variable degree in the offspring of eclamptic mothers. It is stated by Esch that 22.7 per cent. of the children, born of eclamptic mothers, die. Similar symptoms and pathological changes are observed in the intoxications following the administration of arsenic, phosphorus, chloroform, and some other chemical agents. Graham[9] has also pointed out the similarity of the picture found in asphyxia. Graham suggests that the routine administration of chloroform to women in labor may be a factor. He shows that the chloroform poisoning produces a picture suggesting deficient oxygenation, and that the onset of the hemorrhages in the newborn at the fourth or fifth day corresponds to the time of appearance of the symptoms in late or delayed chloroform intoxications. To determine the relationship between chloroform anesthesia and hemorrhagic disease, Graham gave chloroform to pregnant guinea-pigs, and found the pathological picture in the offspring after abortion similar to the changes in Buhl's, or Winckel's disease.

The chemistry of the blood and the problems of blood coagulation demand much attention in any consideration of hemorrhagic disease. In spite of the vast amount of research and investigation on this subject, the exact mechanism of blood coagulation is not understood. It has been said, that for every investigator there is a new theory. However, there are certain fundamental premises on which there is nearly universal agreement. It is obvious that few conclusions concerning abnormalities in blood coagulation can be drawn, as long as the normal mechanism is undetermined. The following general plan is probably fundamentally true:—

$$\begin{array}{c}\text{Prothrombin} \\ + \\ \text{Calcium Salts} \\ + \\ \text{Kinase}\end{array} \searrow \begin{array}{c}\text{Thrombin} \\ + \\ \text{Fibrinogen}\end{array} \searrow \text{Fibrin Clot.}$$
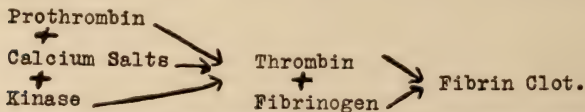
All the various substances that enter into the formation of the fibrin clot have not been isolated. Fibrinogen has been obtained in a pure or a nearly pure form.

Fibrinogen is a globulin, present in normal blood-plasma in the proportion of 0.2 to 0.8 grm. in 100 c.cm. plasma. It forms the greater part of the clot and is probably entirely exhausted during coagulation. The

fibrinogen-content determines the firmness of the clot. If it is reduced in amount, the clot is flabby, and hemorrhages may occur because the coagulum is not sufficiently firm to prevent leakage. It is stated that the fibrinogen content is low in extensive liver degenerations and that the liver may be concerned in its production. It is also reduced in amount in poisoning with phosphorus or chloroform. Doyon[10] showed, experimentally, that various things which destroy liver parenchyma cause fibrinogen to be decreased or absent, and the blood uncoagulable. This condition is not known clinically. Mellanby[11] brought out the interesting point in his work that an increased amount of fibrinogen prolongs coagulation time, and a decreased amount of fibrinogen causes a shortened coagulation period. This observation, if confirmed, may explain why the coagulation time is decreased after much fibrinogen has been lost in severe hemorrhages.

Less definite are the facts known about thrombin (fibrin ferment). The term fibrin ferment is not used as much as formerly. It is doubtful if thrombin is a ferment because (a) boiling does not easily destroy it and (b) it does not appear to act as a catalytic or pseudocatalytic agent in its reaction with fibrinogen to form fibrin. Howell[12] has been able to isolate thrombin in nearly pure form. If it is added to a solution of fibrinogen, fibrin is formed and coagulation results. Its mode of action is also uncertain. It is fairly certain that thrombin, as such, does not exist in the circulating blood, but appears shortly after the blood is shed. All the constituents of thrombin from which it is formed must therefore be present in the blood. The fresh clot or serum contains free thrombin. It is said that thrombin readily passes over into an inactive form, metathrombin, on standing.

The substance from which thrombin is formed is called prothrombin. It is agreed that thrombin does not exist as such in the blood, and there must be a mother substance, but this theoretical substance has not been isolated. Howell states that prothrombin occurs in normal blood, but is bound to the so-called antithrombin. Antithrombin has been much discussed in recent years in connection with the phenomena of blood coagulation. As far back as 1902 Conradi was able to isolate a substance which inhibited blood-clotting by autolysis of various organs and tissues. The rôle of antithrombin is entirely theoretical at present. It occupies an important place in Howell's theory. Howell believes that the prothrombin is bound by antithrombin. Another substance, thromboplastin, liberated from tissues or blood-platelets, unites with the antithrombin and so frees the prothrombin. Sufficient evidence has been brought to bear to show that antithrombin prevents the union of thrombin and fibrinogen. Whipple, writing on this subject, states that a substance, having coagulation-inhibiting effect, is produced during anaphylactic shock, and that the liver is concerned in the reaction. Schwarz and Ottenberg[13] sum up the various substances having an inhibiting effect on coagulation. Hiru-

din is obtained from the leech, and is said to be able to prevent coagulation in seven thousand times its weight of blood. Snake-venom has a similar action, but less strong than hirudin. Bile prevents the action of thrombin or its formation. The amount of bile or bile salts which is necessary to be present to secure this action is in great excess of the amount that is ever present clinically. There is no direct relationship between the degree or intensity of jaundice and the degree or susceptibility to hemorrhage. The most intense grades of jaundice may exist without hemorrhage, and, reversely, severe hemorrhages occur with slight or absent jaundice in hepatic diseases. Acids or alkalies retard or prevent clotting. Oxalates and citrates act likewise, acting by precipitating calcium. Injections of peptone and albumose also delay clotting. Erben[14] has shown that peptone may occur in leukemic blood. This may have some bearing on the delay in clotting and occasional hemorrhages in this disease.

The rôle of kinase in coagulation is also problematic. This substance is liberated in varying amounts from different tissues. It is present to a greater degree in the thymus, testis, liver, and kidney than in other tissues. Howell proved that tissue extracts or juices will accelerate clotting. Thrombokinase has not been isolated, and for that reason it has not been possible to determine gross variations in the kinase content of the tissues in various pathological conditions. Experimental work by Morawitz and Lossen[15] has shown a definite relationship between an absence or decrease of kinase and hemophilia; and Morawitz and Bierich[16] have determined a similar decrease in cholemia. Mellanby, who has worked on this subject, states that serous fluids contain no kinase, and are unable to coagulate for this reason. This can be explained by the absence of cells in the serous fluids. The addition of a drop of blood-serum to serous fluids will produce coagulation if the former contains kinase. This simple procedure is therefore a test for the presence or absence of kinase. Morawitz believes that the blood-platelets are the chief source of kinase. The blood-platelets begin to disintegrate as soon as the blood is shed; the leucocytes less rapidly.

Calcium salts are essential to the formation of thrombin, but the exact rôle it plays has not been determined.

The various conditions in which hemorrhage occurs as a part of the clinical picture cannot be properly classified until the exact abnormality in the blood coagulation is determined. In hemophilia, different investigators claim various abnormal conditions. A diminution in the amount of fibrinogen, calcium salts, prothrombin, or thrombokinase has been variously claimed. An excess of antithrombin is also stated to be the abnormal factor. The further distinction is made by Weil[17] that in the hereditary form of hemophilia, there are anticoagulants in the blood, while in the sporadic type, certain substances necessary to coagulation are absent. The coagulation time is changed greatly at various times

in hemophilia. Changes in the amount or absence of fibrinogen in hepatic degenerations has been considered above. Doyon states that experimental phosphorus poisoning will cause a decrease in the prothrombin. Variations in kinase have been observed. Sahli thought kinase to be decreased in hemophilia. Morawitz and Lossen have also demonstrated a decrease in kinase in hemophilia.

Efforts to check hemorrhage in various pathological conditions have taken many forms. The hemorrhages have occurred in such a variety of conditions that it is not surprising that empiricism should have prevailed. The hemostatic measures employed included the use of calcium salts, the use of gelatine, adrenalin to constrict the blood-vessels, many drugs by mouth, and various physical measures. The unsatisfactory results from these measures lead to the use of blood in various forms. Pure blood, defibrinated blood, the blood-serum of animals and man were all tried. Blood was used early to stop hemorrhages in bleeding after tooth extraction and injuries by means of local applications. Early pioneers in its use were von Manteuffell in 1893, who used it after tooth extraction, and Bienwald, who used applications of fresh healthy blood in a crushing injury. From this time reports were not uncommon where blood in some form was used to stop hemorrhage. Weil was one of the early workers in this field, especially in hemophilia. He found that he could shorten the coagulation time in hemophilia after intravenous use of animal serum,[18] and this effect would persist for five weeks. Baum[19] pursued his investigations with rabbits whose blood had been made uncoagulable or nearly so with hirudin. He found that when hirudin was given in sufficient quantity to prolong the coagulation time only, the serum treatment made coagulation more rapid; but when enough hirudin was given to stop coagulation entirely, the serum had no effect. Clinically, animal serum has been used in hemophilia, jaundice, purpura hemorrhagica, before and after operations as a prophylactic measure, typhoid hemorrhage, ruptured tubal pregnancy, menorrhagia, rheumatism, melana neonatorum, local hemorrhages from trauma or operation, and many other conditions.

The use of animal serum or whole blood as a means of checking hemorrhage did not at first become generalized. Despite the large number of case reports, the method did not become popular. The reasons for this were several. The most important was the dissatisfaction with the results. There had been no uniformity of method. Blood was used from the rabbit, horse, cattle, guinea-pig, and other animals. The amount administered was too small in nearly all cases. Transfusions were done with alien blood (lambs) with fatal results. The toxic effects of alien blood militated against its general adoption. The symptoms produced in this way are many and in some cases very severe. Fatal results have occurred. The work of von Pirquet and Schick has thrown much light on this subject. They showed that the first dose of an alien serum sen-

sitized the animal receiving it, and the second or succeeding injections were more likely to produce the toxic effects. The condition was called anaphylaxis by Richet. There is a direct relationship between the amount injected and the probability of toxic symptoms developing. Small amounts (5 to 15 c.cm.) produced serum sickness in 6.5 per cent., while large amounts (100 or more c.cm.) caused sickness in 85 per cent. These anaphylactic phenomena may be produced by the serum of an animal in any alien species. Rosenau and Anderson produced symptoms in the guinea-pig from the serum of dogs, hogs, cattle, sheep, cats, and rats. They showed also that the poisonous principle was present in normal serum and was not dependent on its antitoxic properties. The toxic principles in the blood-serum which cause anaphylactic phenomena have not been isolated.

Von Pirquet and Schick state that there is a marked fall in blood-pressure with the shock of anaphylaxis. They point out also that there is an increase in the coagulation time, and a decrease in the amount of complement in the blood. The symptoms of anaphylaxis are variable. Fever is present, usually high, but fluctuating within wide limits. Skin manifestations are nearly always present. The rash may take varying forms. Urticaria is most common. General or localized edema is sometimes present. The joints may be red, swollen, and tender. The lymph-glands may become palpable and tender. A less constant symptom is excessive lachrymation with markedly suffused conjunctivæ. A generalized itching is usually constant. Less constant manifestations are albuminuria, cylindruria, or hematuria. Hemorrhages from the bowels and urethra have been reported. Sudden deaths occasionally occur.

Human serum injected into humans produces no toxic symptoms. It has been shown by Welch[20][21] that it can be injected in very large amounts without toxic symptoms. Welch points out also that the serum is a perfect food, already digested. This is not without importance, because the nutrition is often badly affected in hemorrhagic disease of the newborn. The bowels may be filled with decomposed blood, thereby impairing the digestive functions.

Human serum has proved to be nearly a specific in hemorrhage of the newborn. This disease has been one of high mortality under the older methods of treatment. Townsend's statistics of 709 cases with a mortality of 79 per cent. are very comprehensive. The condition is relatively uncommon, but is seen by all practitioners. It occurred in 1.4 per cent. of 1,300 births at the Lying-in Asylum of Prague and in 0.5 per cent. of 5,225 births at the Boston Lying-in Hospital. Welch has been treating this disease with human serum since 1909, and since that time has had a greater experience with it than any other person. He is convinced that it is a specific remedy. There is no definite dosage. It is usual to give an initial injection of 10 c.cm. and repeat this as often as is necessary to stop the hemorrhage. The injections may be given at intervals

of three or four hours. In obstinate cases, the amount given at one time may be much larger. Welch's results are very striking. He states that 18 cases of bleeding at the Lying-in Hospital, New York, treated in various ways prior to the use of serum, resulted in 17 deaths. With the use of serum, there was almost invariable recovery in over 30 cases.

The method of securing the serum is variable. Welch has devised an apparatus for this purpose. The large veins at the elbow are most accessible and are universally used. After the necessary cleansing, a needle of sufficient bore is inserted and the blood allowed to flow into a sterile flask. A large syringe may be used, but does not allow a large amount of blood to be obtained. Various suction devices may be elaborated. The blood, after its withdrawal, is allowed to clot and the serum is ready for use. The serum should be always used as fresh as possible, but may be kept on ice for several days. The blood is best obtained from a relative of the patient. In the 3 cases reported, the writer secured the blood twice from the father and once from the mother of the patient in question. It is not at all necessary that the serum should be obtained from a relative, but this is more apt to insure its purity and lessen the danger of a possible transmission of an infection. When large amounts of serum are necessary, healthy individuals may be secured in various ways.

Attempts have been made to use whole or defibrinated blood in place of blood-serum. The objection to whole blood is a considerable one. The blood must be used at once, or clotting occurs. Even if arrangements are made to use it at once, clotting may occur before the injection can be made. It is not always possible to have the donor and the recipient at the same place at the same time, and this must be so if whole blood is used. Again the bulk of whole blood is large compared to the serum alone, and in small infants this is important. The risk of infection in the slowly absorbing clot is not to be disregarded. The theory that the red blood-cells of whole or defibrinated blood might functionate and so combat the accompanying anemia is not substantiated. Ehrlich has shown that if red blood-cells are injected into the body they must be digested and removed. This is done by means of an hemolytic body which Ehrlich calls an isolysin. This calls for an exhibition of energy which is needless and harmful in these anemic and weakened patients. It seems, therefore, that the only possible advantage in using defibrinated or whole blood is the questionable one of ease of preparation, but the difficulty of the preparation of the serum is not great.

The best results from the use of normal blood-serum have been obtained in the hemorrhages of early life. There appears to be, however, a much greater field for this remedy. It has been used in many other conditions, not all hemorrhagic. A promising field is its prophylactic use prior to operations where hemorrhage is feared. Willy Meyer[22] has used serum extensively in this class of patients with very satisfactory

results. It has been used also in post-operative hemorrhage, in jaundiced patients. Welch has had apparently good results in sepsis following labor and abortions. It has been used in typhoid hemorrhages, the hematemesis of hepatic cirrhosis, the intestinal hemorrhages of nephritis and uremia, the hemorrhages of malignant disease of the bile passages, liver or pancreas, hemophilia, various purpuras, and other conditions.

The following 3 cases are illustrative of the effects of the serum. The reports are intentionally made brief.

CASE I.—Girl, æt. nine. Seen in consultation with Dr. Lawless. Previous history of measles, chicken-pox, and diphtheria. The child began to bleed from the nose January 6th, 1912. The hemorrhage soon became general. There were innumerable small purpuric spots on the trunk, extremities, and mucous membrane of the nose and buccal cavity. The bleeding was extensive from the nose, buccal cavity, and in the stools and urine. The joints showed no arthritis. A low grade temperature varying from 99° to 101° F. was present throughout the illness. The tonsils were large. The hemorrhage resisted vigorous attempts to check it with local applications of vinegar and adrenalin, tamponades, internal administration of calcium and adrenalin. The writer saw the case on January 10th. Blood was drawn from the child's father and subcutaneous injections of serum were at once instituted. These were continued for forty-eight hours, at the end of which time the hemorrhages had entirely ceased, and have not recurred. The child slowly recovered from her exsanguination.

CASE II.—Male child, æt. four days. Seen in consultation with Dr. W. H. Snyder at the Maternity Hospital, for conjunctival hemorrhages. The child was born after a normal labor of an apparently healthy mother. Bleeding began on the fourth day of life. The conjunctivæ were first involved, so that large accumulations of blood collected behind the eyelids, bulging them outward to a marked degree. Hemorrhages began also from the nose, mouth, penis, and umbilicus. Blood was obtained from the mother and a hospital nurse. Sixty c.cm. of blood serum were given in 10 c.cm. doses at intervals over two days. All hemorrhages stopped promptly and did not recur.

CASE III.—Female child, æt. five weeks. Seen with Dr. Harold Morgan. Parents healthy. Child bled slightly from umbilicus at birth. No recurrence until the fifth week. Bleeding began from mucous membranes of nose and mouth, intestine and stomach. Icterus slight. Fever ranging from 99° to 101½° F. A small amount of horse serum was injected without effect on the bleeding. Blood was obtained from the father and about 20 c.cm. of serum injected. The bleeding lessened at once and was entirely absent in two days. The child improved in every way, the anemia was passing, and the child allowed to go home to a different city. A few days later the child was suddenly seized with an attack of hemiplegia and death followed shortly. There was at no time, however, any recurrence of visible bleeding, although death was probably caused by cerebral hemorrhage. No autopsy.

The results in the first 2 cases were most striking. The blood-serum seemed to be a real specific in every sense of the term. Not only did the bleeding stop, but the fever and other symptoms were promptly ameliorated. The third case received apparently too small a quantity of the serum. The symptomatic result was also striking in this case. The vomiting and visible bleeding stopped very quickly. Sufficient numbers of cases have now been reported to be convincing that this remedy is a true specific for the hemorrhages of early life.

CONCLUSIONS.

1. The term hemorrhagic disease of childhood includes a number of conditions and diseases, in which the hemorrhage dominates the clinical picture.

2. These conditions have not been accurately classified because the etiology and pathology are not yet worked out.

3. It is probable that there are a number of bacterial organisms, any of which may produce this hemorrhagic condition in childhood.

4. The chemistry and mechanism of blood coagulation is not yet settled.

5. The efforts to check hemorrhages by means of calcium, gelatine, adrenalin, and styptics have been unsatisfactory.

6. The use of animal serum rather than human serum has not been successful.

7. Human serum never produces toxic results.

8. Human serum should be invariably used in all hemorrhages of childhood.

9. A liberal amount should be used, and it should be continued a short time after the hemorrhages have ceased.

BIBLIOGRAPHY.

1 Babes: Bacterial Research in Regard to Septic Processes in Childhood. 1899. Leipzig.

2 Baginsky (*Virchow's Archiv fuer Path, Anat.*, Vol. CXV, p. 460, 1899).

3 Strelitz (*Archiv fuer Kinderheilk.*, Vol. XI, p. 11, 1889).

4 Neumann (*Ibid.*, Vol. XII, p. 54, 1891).

5 Finkelstein (*Jahrbuch fuer Kinderheilk.*, Vol. LI, p. 560, 1900).

6 Wolzynski (*Internat. klin. Rundschau*, Vol. VII, p. 969, 1893).

7 Hamill and Nicholson (*Archiv. Pediat.*, Vol. XXI, p. 641, 1903).

8 Gaertner (*Archiv fuer Gynaek.*, Vol. XLV, p. 272, 1894).

9 Graham (*Journ. Experiment. Med.*, Vol. XV, No. 4, p. 307, 1912).

10 Doyon (*Comptes rendus Société de Biologie*, Vol. LVIII, 1905).

11 Mellanby (*Journ. Phys.*, Vol. I, 1909).

12 Howell (*Amer. Journ. Phys.*, Vol. XXVI, p. 453, 1910).

13 Schwarz and Ottenberg (*Amer. Journ. Med. Sciences*. Vol. CXL, No. 1, p. 17).

14 Erben (*Zeitschr. fuer klin. Med.*, p. 282, 1900).

15 Morawitz and Lossen (*Deutsch. Archiv fuer klin. Med.*, Vol. XCIV, p. 110, 1908).

16 Morawitz and Bierich (*Archiv. fuer Experiment. Path. und Pharmakol.*, Vol. LVI, p. 115).

17 Weil (*La Presse Médicale*, Vol. XIII, p. 673, 1905).

18 Weil (*La Presse Médicale*, October 18th, 1905).

19 Baum (*Mitteil. a. d. Grenzgebiet. der Med. und Chir.*, Vol. XX, No. 1, 1909).

20 Welch (*Amer. Journ. Med. Sciences*, CXXXIX, No. 6, 1910).

21 Welch (*Amer. Journ. Obstet.*, p. 597, April, 1912).

22 Meyer (*Surgery, Gyn. and Obstet.*, August, 1911).

Sparks Building.

EXCISION OF THE PAROTID GLAND FOR MIXED TUMOR.

———

By W. S. Wiatt, M. D., of East St. Louis,
Instructor in Surgery, St. Louis University,

AND

C. A. W. Zimmermann, M. D., of East St. Louis.

———

After a study of the surgical anatomy of the parotid gland, one is impressed with the difficulties and dangers attending its complete removal.

Indeed, from an anatomical point of view, its complete excision under certain conditions would jeopardize important structures so much as to render the operation unjustifiable. However, as suggested by Fuhrer, when the gland is the sight of a neoplasm, its lobes are rounded off and it is lifted away from the deep structure of the neck, thus rendering its removal less dangerous.

No doubt the gland has been completely removed many times and doubtless there are many cases recorded as complete excision of the parotid gland in which there·was excised a tumor of the parotid region, the gland or a part of it being left behind.

The fascial envelope of the gland is deficient at the anterior superior part, hence a neoplasm growing in this direction would have less resistance to overcome than when growing in an outward direction. This fact explains the presence of the symptom of dysphagia when associated with these growths.

Pathology.—For the past fifty years the pathology of parotid gland tumors has been a moot question among investigators.

Billroth, in 1856, maintained that three-fourths of all tumors of the parotid gland were sarcomata or connective-tissue tumors, and not epithelial as was taught by earlier writers.

Nasse, in 1892, and Volkmann, in 1895, maintained that these tumors were of endothelial origin. Endothelium was a name given by His to the epithelium coming from the parablast, *i. e.*, the lining of the blood-vessels, lymphatics, and serous membranes. These cells are also found in lymph-spaces.

To be endotheliomata then, these tumors must have their genesis in cells lining tissue-spaces, blood-vessels or lymphatics, and the cells lining these tissue-spaces must be proved to be of mesoblastic origin and not from hypoblast.

The difficulty in determining what particular kind of tissue gave origin to a given parotid tumor, lies in the fact that there are so many different

kinds of tissue included in the structure of the gland. Consequently, the name "mixed tumor" was given to a class of parotid gland neoplasms, and really indicated a lack of definite, accurate knowledge as to their pathology, since it was noncommital.

Possibly the name "complex tumors," as suggested by Wood, is a better one.

In a study of 59 tumors of the salivary glands, lip and pharynx, Wood found that 54 were mixed tumors of the endothelial type.

Mixed tumors of the parotid run a clinical course which is strikingly different from sarcomata and carcinomata elsewhere, in that they are slow growing and generally benign, there being no lymph-node involve-

Fig. 1.

Fig. 2.

Fig. 1.—Front view before the operation.
Fig. 2.—Side and rear view before the operation.

ment; and recurrences are likely to remain local in a considerable proportion of cases. Both Butlin and Billroth were of this opinion after a study of a number of cases.

Sutton makes the observation that it is curious that no chondrifying tumor has been found in the pancreas; and in 1906 classified them among the sarcomata.

Symptoms.—Billroth asserts that Bell's paralysis is rarely present unless the tumor is carcinoma.

Deaver reports a case of tumor involving the lymph-nodes over the gland which caused Bell's paralysis. Innocent tumors of the parotid seldom or never cause paralysis, regardless of size (Billroth).

The case herein reported had no interference with the function of the facial nerve.

Pain may be severe, as it was in the writer's case, after the tumor attains any considerable size, even though the tumor is benign. Doubtless this pain is due to the stretching of the dense cervical fascia which covers the gland. Dysphagia is frequently associated with large tumors. Hemorrhage from ulceration into a vessel may occur. Pressure on the internal jugular by the tumor may cause passive congestion of the brain.

Diagnosis.—Retropharyngeal growths cause bulging of the parotid region; examination *ab ore* ought to make the diagnosis easy.

Fig. 3.   Fig. 4.
Fig. 3.—Front view after the operation.
Fig. 4.—Side view after the operation.

To say that a tumor involves the gland, or the parotid lymphatics over the gland, is sometimes impossible before the operation.

Deaver reports a case in which a large tumor was removed and thought to involve the gland; but after removal, the gland, much atrophied, was seen in the bottom of the wound.

Rarely suppuration in the gland may simulate a tumor in clinical signs. The writer has seen an enlargement of the submaxillary gland (which looked very much like a new growth) caused by a beard of wheat in Wharton's duct.

Report of Case.—December 2nd, 1909. Mrs. L., *æt.* forty-eight years. Weight, formerly 125 ℔., now 99 ℔. Five years ago noticed a lump below and in front of ear about the size of a pea. This lump or tumor

grew rapidly. One year ago it began to cause pain. The pain increased so that for the past year the patient has had about half the normal amount of sleep. Family history negative as to cancer.

Examination.—A tumor, irregular in shape and presenting both nodular and cystic areas on its surface, projects laterally from below and in front of the ear. It measures 7½ in. on its surface from about the mental foramen in the inferior maxilla to the mastoid process of the temporal bone. It measures 8 in. on the surface from half an inch above the right zygoma to a point over sternomastoid on a level with the cricoid cartilage. There is a fluctuating area as large as a half dollar over the lower pole of the tumor. The growth is slightly movable in an antero-

Fig. 5.   Fig. 6.

Fig. 5.—Front view twenty months after the operation.
Fig. 6.—Side view twenty months after the operation.

posterior direction, and apparently involves the parotid gland. There are no enlarged lymph-nodes in the neck or axilla. Pulse, 84. Heart sounds normal. Patient complains of "heart fluttering" at times. Urine normal.

Operation, December 30th, 1909.—An incision, beginning ½ in. above zygoma and extending to within ½ in. of the clavicle over right sternomastoid, was made. The skin flaps were dissected back, and the external and anterior jugular veins were doubly ligated and divided between ligatures. The tumor was then grasped at the lower pole with a volsella, and an effort made to lift it out of its bed and thus render the external carotid more accessible for ligation; but the neoplasm was

found to be too firmly fixed to admit of any such manipulation. Beginning at the lower pole, the fascial attachments were clamped and cut as close to the capsule as possible. After the division of each of these, it could be rolled a little farther out of its bed. Mayo scissors, the fingers, and gauze were used to advantage during the dissection. No effort was made to dissect out the facial nerve. The tumor weighed 15 oz. three hours after removal. On February 4th, 1910, when the face is in repose, there is a slight deviation of the philtrum to the left. When the patient laughs or smiles, paralysis of the muscles of expression shows markedly.

PATHOLOGICAL REPORT BY DR. ZIMMERMANN.

Macroscopic Examination.—The tumor, which has been kept in formaldehyde solution for some months, is the size of a small cocoanut, very nodular and of a dark brown color. The consistency is quite hard excepting in two places where it presents areas the size of a silver quarter, very soft. A firm capsule completely envelops the growth. It cuts like cartilage, and on the cut surface the lobulated arrangement of the growth can again be recognized. The lobes are of a glistening white with striations irregularly concentrically arranged. The lobes vary in size and are separated from one another by a substance darker and less glistening than their own structure.

In a number of instances entire lobes have broken down, leaving empty spaces which correspond to the soft areas previously mentioned. (Cystic fluid was evacuated from these spaces at the operation.) In other places lobes present degenerative changes, usually about their periphery, the broken down material being present as a soft granular substance. Blood-vessels cannot be recognized.

Microscopic Examination.—Sections stained with hematoxylin and eosin. Not all sections present identical pictures, and observations recorded have been taken collectively from a series of sections. The capsule is distinctly of connective-tissue comparatively rich in cells. It penetrates the tumor mass and divides it into lobes, and in places into lobules. It also contains blood-vessels, often well filled with blood. And at irregular intervals it supports epithelium, now arranged to represent transverse sections of glands, then longitudinal sections through follicles, and again as clusters representing nothing further in particular. Generally, projections from the connective-tissue capsule can be followed only partially around the lobes, inasmuch as it rapidly fades into a hyaline substance, taking up faintly and irregularly the eosin, and which serves to separate lobes from one another, and to divide lobes into lobules. The impression one gains from the first glance at the parenchyma is that one is dealing with hyaline cartilage, nor is this impression entirely dispelled by further examination, though many deviations from normal cartilage are seen. The arrangement of cells is very irregular,

and does not imitate any normal structure. Neither are all cells shaped alike; there being oval, bowl-shaped, goblet-shaped, spindle-shaped, cone-shaped, round and even other formed cells present.

The cell protoplasm is generally white, rarely showing a pink tinge; the appearance is often as if a nucleus were resting in an empty cell. It requires close focusing to detect a cell membrane.

The nuclei also present various shapes—oval, crescentic and stellate forms predominating, the latter sending projections into the protoplasm. They take the stain well and show no evidences of degeneration. They are sometimes centrally, and sometimes excentrically placed in the cell.

Lobes near the periphery of the tumor show cells which are larger and better demarcated, and whose nuclei are a deeper blue than lobes farther in. In the former, the cells are quite regularly round- or spindle-shaped. No blood-vessels are noticed within the lobes.

Sections stained with iodine, carbol-fuchsin and methylene-blue, or with polychrome methylene-blue, present nothing further to note.

Conclusions.—A tumor containing a wealth of connective-tissue elements, the stroma having largely undergone a degeneration into a substance showing no cell structure and taking practically no stain; the parenchyma showing cell structure resembling hyaline cartilage, with irregular cell formation and arrangement; epithelial elements arranged to represent mostly indifferent structure, and, perhaps, too few in number to be considered as anything but remnants of acini; the tumor completely encapsulated. Chondromyxosarcoma, whence its origin?

BIBLIOGRAPHY.

[1] Butlin: Tumors of the Parotid Gland. (*Lancet*, Vol. 2, No. 16, p. 1024, 1901).

[2] Reder: Tumors of Parotid Gland. (*Interstate Medical Journal*, Vol. XVII, No. 1, p. 42, January, 1910. Also *Journ. Missouri State Med. Assoc.*, Vol. 6, p. 661.)

[3] Scudder: Excision of the Parotid Gland for Tumor. (*Amer. Journ. Med. Sciences*, Vol. 124, No. 6, p. 1013, 1902.)

[4] Carwardine: Excision of Parotid Gland with Preservation of Facial Nerve. (*Lancet*, Vol. 2, p. 892, 1907.)

[5] Cordier: Mixed Tumor of the Parotid Gland. (*Journ. Amer. Med. Assoc.*, Vol. 50, p. 183, 1908.)

[6] Keen: Enormous Mixed Tumor of the Parotid Region Reaching to the Clavicle and Weighing about Seven Pounds. (*Journ. Amer. Med. Assoc.*, Vol. 42, p. 1138, 1904.)

[7] Kelly (*Philadelphia Monthly Med.*, February, 1899).

[8] Wood (*Annals of Surgery*, pp. 57 and 207, January and February, 1904.)

[9] Hendon: Cancer of the Parotid Gland. Report of 5 Cases. (*South. Med. Journ.*, Vol. II, p. 552, 1909.)

HYPOTENSION—ITS CLINICAL SIGNIFICANCE.

By Francis Ashley Faught, M. D., of Philadelphia,

Late Director of the Laboratory of Clinical Medicine, Medico-Chirurgical College and Hospital; Instructor in Medicine, Medico-Chirurgical College.

It seems strange that in the study of blood-pressure, nearly all our attention has been directed to those diseases accompanied by hypertension, and very little to conditions causing a reduction in normal pressure—hypotension; and yet, when we pause to consider, it is perfectly evident that low blood-pressure must of necessity be a part, sometimes an important part, of the symptom-complex of a number of pathological conditions, for example, wasting diseases, acute infections, toxemias, etc.

The term hypotension signifies a departure from the normal level in which the curve of pressure is below the normal established for a given individual.

The first requirement then for a proper conception of the meaning and significance of hypotension as applied and relating to diseased conditions is the establishment of normal low limit of health, which shall serve to separate the normal from the pathological.

The limit is, of course, largely arbitrary, depending as it does upon so many variable and varying factors. To maintain its full value it must be modified slightly to conform to our knowledge of the many so-called physiological factors active in each individual case.

Experience teaches that 105 mm. may be taken as the low limit of normal blood-pressure in man and 95 mm. as the low limit of woman. This will, of necessity, be modified slightly by the age, occupation and muscular development of the individual. The only way to estimate the degree of abnormality in the blood-pressure is to apply the knowledge obtained from experience in examining a large number of cases. Therefore, it is usually advisable to employ the blood-pressure test as a routine in all cases, in order to develop one's ability to interpret the significance of each individual finding.

The lowest blood-pressure in an adult compatable with life has been reported by Neu to be from 40 to 45 mm., and this only occurred with subnormal temperature accompanied by unconsciousness. He has seen recovery after a temporary fall in pressure, as low as 50 mm.

For clinical purposes we recognize several varieties of hypotension, a knowledge of which aids in our understanding of the conditions described.

Terminal hypotension, as the term implies, means that abnormal low-

ering of tension in the circulation which indicates the approaching end.

With the approach of death from any cause, the blood-pressure tends more or less rapidly toward zero. The rapidity with which this occurs, and its relation to the actual cause of death, are determined by so many factors about which very little is known, that little that is really definite can be said. According to Janeway,* in protracted illness, pressure as low as 60 mm. (5 cm. cuff) may persist for several days before death. In such cases the hypotension is of some value as a sign of impending dissolution, but as a rule the terminal fall in pressure is usually a matter of minutes or hours.

Essential Hypotension.—There are cases occasionally that seem to have a constitutionally low blood-pressure. These cases show no definite signs of disease, and no discoverable cause can be assigned for the condition, though in some cases it may later develop that this state was really a very early sign of tuberculous infection. This point will be developed later. Such individuals are rarely equal to any particular effort, either mental or physical.

Primary or true hypotension is closely allied to the preceding, but is distinguished from it by the discovery of some assignable cause other than the pre-existence of some condition causing hypertension. Bishop defines primary or true hypotension as being those cases where the pressure-reducing mechanism has failed when there has been no previous overdemand for pressure.

Relative Hypotension.—This term would seem to be a necessary one and should be applied to those cases whose actual pressure, while still above the calculated normal, has fallen from a former pathological high level to such degree that symptoms due to this fall have developed. A fairly common example of this is the frequent occurrence of edema, or other signs of circulatory failure, following injudicious attempts to reduce a high pressure.

The same condition obtains in a failing cardiovascular system, when the pressure has been for a long time high. Here also we may have most serious and distressing symptoms, pointing to circulatory failure, and yet the pressure will be found still above the estimated normal level.

Edgecombe** groups the types of disorders presenting low pressure as follow :—

(1) Subjects with poor circulation, with cold hands and feet and liable to chilblains. They may gain a temporary rise by means of baths, massage and exercise, while at the same time the circulation improves ; but it is difficult to effect any enduring rise in the general level of the

*Clinical Study of Blood-Pressure.
**Editorial, *Medical Record*, April 29th, 1911.

blood-pressure, for they are prone on cessation of treatment to relapse to their former state.

(2) Cases of neurasthenia, having as their prominent characteristic, profound fatigue, either somatic or psychic, or both. It is not easy to say whether the low blood-pressure in such cases of neurasthenia is the cause or effect of the extreme fatigue. A rise in blood-pressure is an almost invariable accompaniment of improvement.

(3) Tobacco usually has the effect of raising the blood-pressure with the apparent anomaly that the heavy smoker frequently has a subnormal pressure.

(4) In cases of dilated heart, with or without valvular disease, the pressure will sometimes be found low, and a rise in pressure is one of the indications of the progress of the case toward recovery.

(5) There are many examples met with of the so-called gouty or rheumatic manifestations of lumbago, sciatica, or neuritis, which show a blood-pressure somewhat below normal. Many of these cases have a subnormal acidity of the urine, and are liable almost constantly to a copious deposit of phosphates, which leads to, or is accompanied by, a state of nervous depression.

(6) The clinical symptom, phosphaturia, in whatever condition it may occur, is generally accompanied by a low blood-pressure.

(7) Young subjects with "rheumatoid arthritis" frequently have a blood-pressure below normal, which rises as the condition improves.

In the summary which follows, an effort has been made to eliminate all reports that appear to the writer to be unreliable, or which lack verification. Quotations and references have been inserted wherever possible.

Diseases of the Heart.—Considering just those conditions bearing a direct relation to the cardiovascular system, we find that compensated valvular disease *per se* has no effect upon the blood-pressure, either to lower or elevate it, except in aortic regurgitation, or when the cardio-valvular defect is accompanied by myocardial, arterial or kidney degeneration. The effect of these is to increase blood-pressure, except in the short period accompanying the terminal stage, which lasts as a rule only a few hours or less.

Mitral Stenosis.—Extreme narrowing of the valve orifice may occasionally so reduce the volume of blood passing through the heart that the blood-pressure is lowered simply because the heart is able to pump only a fraction of its normal amount.

In *circulatory failure from heart disease,* either muscular or valvular, the tendency of the pressure is downward, but according to Bishop,* failure of the circulation does not become a matter of special anxiety during the acute stage (with patient at rest). The low pressure usually

*Heart Disease and Blood-Pressure, 1907.

shows itself when the patient resumes his occupation. Bishop also points out that it is necessary to remember that low arterial tension is to be regarded as pathological only when it is so little above venous pressure, as shown by venous congestion, large liver, etc., that the tissues and organs are not properly supplied with blood. This emphasizes the point made that the actual pressure level found does not always measure the degree of pathogenicity of the case, each case being its own particular law and must be studied and treated according to the conditions met.

Alterations in Heart-Rate.—These do not, as a rule, influence blood-pressure. We believe that blood-pressure has a marked influence on pulse-rate. The action of the heart to blood-pressure is in the relation of a force-pump to a water supply: as the demand for increased pressure
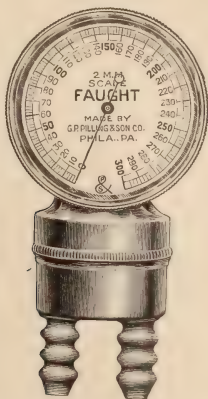
Actual Size Faught Pocket Indicator.

or sustained pressure rises, the pump responds with greater force and energy, and this mechanism is so delicately balanced that under ordinary conditions very little fluctuation in pressure occurs.

Two conditions, however, have been found to have an influence on blood-pressure, the cause and significance of which are as yet obscure.

(1) Paroxysmal Tachycardia. The pulse-rate may be from 150 to 300, the heart-sounds good, and the pulse small, sometimes it cannot be counted. The blood-pressure is usually low, probably because the shortness of diastole does not allow a proper filling of the ventricle; the venous pressure is high. In the intervals, the circulation is apparently normal; and

(2) Bradycardia. The effect of blood-pressure is variable, depending on the cause and other conditions when present. When extreme, blood-

pressure is always lowered, such patients cannot exert themselves without dyspnea, and even at rest may suffer from attacks of syncope.*

Finally, in close relation to the circulation in diseases of the heart, it has been found by Krehl and others that in the last stages of arteriosclerosis, widespread dilatation of the splanchnic area, together with failure of the heart to the demands made upon it, results in a gradually falling blood-pressure, upon which therapeutic measures have little or no response (terminal hypertension).

Shock and Collapse.—Closely allied to this condition, at least from mechanical and physiological standpoints, are shock and collapse.

In both these conditions we find a sudden and dangerous fall in blood-pressure. This is due to one or two conditions. First, the overwhelming of the vasomotor system by circulating toxins, which causes vasomotor paralysis. This is collapse. Secondly, shock, on the other hand, would appear to result from a failure of vasomotor tone, the result of reflex stimulation through the sympathetic system. Experimental evidence shows that the circulatory disturbance, occurring at the height of infections, depends absolutely upon paralysis of the vessels, and not upon any damage to the cardiac mechanism.**

Cardiac Asthma.—This term implies a severe attack of dyspnea occurring in an individual having heart disease. During the attack the pulse is rapid, soft and irregular in force and rhythm. The blood-pressure is usually below normal during the height of the attack, regaining speedily its former level as the attack passes off.

Hemorrhage.—Closely allied to the changes occurring in the circulation during shock and collapse is the state produced by severe sudden hemorrhage. We note a reduction in pressure. This is great, and may become dangerous when the hemorrhage is sudden and profuse, or in those suffering at the same time from shock or collapse, or when the vasomotor tone has by some means, as acute infections, been already reduced.

Altitude.—There is considerable disagreement in the many reports of studies on the effect of altitude on blood-pressure. The majority, however, seem to agree that marked elevations in altitude almost uniformly cause a reduction in blood-pressure. The writer cannot do better than quote here part of the summary of the very able article of Schneider and Hedblom.† Among their conclusions, the following bear on blood-pressure:—

(1) Considerable elevation in altitude tends to lower blood-pressure and to increase the pulse-rate.

(2) The fall is greatest during the early period of residence in high altitudes, the average fall in high altitudes being 1 to 22 mm.

*Krehl's Clinical Pathology. J. B. Lippincott. 1905.
**Crile: Blood Pressure in Surgery.
†*Amer. Journ. Physiol.*, Vol. XXIII, No. 2.

(3) Change in altitude does not affect each individual to the same degree; slight elevation does not affect blood pressure; and psychic influences may modify the reading.

The danger of high altitudes to those having a low pressure, especially if accompanied by a weakened physical condition, is probably due to a further reduction of an already existing hypotension.

Paresis.—Hypotension is the rule, unless kidney complications exist.

Infections.—Tuberculosis. In uncomplicated pulmonary tuberculosis the systolic pressure tends to fall and the diastolic pressure to remain stationary or to rise. Tesser and others report the occurrence of hypotension in uninvolved members of families with tuberculosis taint (essential hypotension). Many authors believe that a continuous hypotension, having no demonstrable cause, is an indication of existing tuberculosis, even in the absence of the usual physical signs.

Emerson* states that hypotension in tuberculosis is marked and constant in advanced cases, almost always present in the moderately advanced cases, and frequently enough found in the very early or doubtful cases to warrant its use as a valuable differential sign; and further that hypotension is progressive as the process advances and rises with progress toward recovery, the pressure returning to normal in cases that are cured. Continued hypotension never persists in the presence of evident improvement in the tubercular process.

Reitter has suggested that the occurrence of hypotension, associated with evidence of nephritis, is suggestive of renal tuberculosis. On the other hand, Sézary** does not find any relation between the condition of the suprarenal glands and the low blood-pressure found in tuberculosis. He believes that low tension is at first due to the direct effect of the action of the toxins of the tubercle bacillus, and that not until later do the suprarenals become involved. He cites cases examined at autopsy which showed almost complete destruction of the suprarenals, and yet during life showed a relatively high blood-pressure.

Typhoid Fever.—Typhoid fever is more frequently accompanied by hypotension than any other acute infection. The systolic pressure averages 90 to 100 mm. In case of hemorrhage, the fall becomes more marked; but the pressure is rapidly sustained upon the arrest of hemorrhage, whether this occurs spontaneously or by operation.

Summarizing the value and importance of the blood-pressure test in typhoid fever, the following résumé by Barach† covers the points well:—

(1) The blood-pressure falls from the normal after the patient has taken to bed, and stays down until convalescence is established, when it returns toward normal.

(2) Typhoid fever is a disease with a blood-pressure below 100.

*Arch. Int. Med., 1910.
**Abstract, Journ. Amer. Med. Assoc., Vol. LIV, No. 15.
†Penn. Medical Journ., July, 1907.

(3)   The blood-pressure is governed by factors of its own and bears no constant relation to pulse-rate or temperature.

(4)   In diagnosis the blood-pressure may be of value in differentiating this disease from others, after we know the behavior of other diseases in this respect. In the diagnosis of the complications it has a value.

(5)   In prognosis the blood-pressure chart is of value. A steadily falling pressure means great danger. As long as the blood-pressure keeps up to a reasonable level, we feel that there is reserve power to work with.

(6)   In the treatment of the disease, the study of blood-pressure will probably be found of the greatest actual value by indicating the need for stimulation, etc.

Pneumonia.—The pressure in pneumonia depends on the severity of the case and the degree of toxemia. The blood-pressure test seems to be of very significant value when employed in conjunction with the pulse-rate.

As expressed by Gibson,[*] it offers a valuable aid in prognosis and a reliable guide to treatment. He says: "When arterial pressure expressed in millimetres of mercury does not fall below the pulse-rate expressed in beats per minute, the fact may be taken as of excellent augury, while the converse is equally true." These observations have been confirmed by the writer, by Gordon[**] and Hare.[†] No case of pneumonia should be treated unless the blood-pressure test is regularly employed, just as the pulse or the temperature is taken.

Cholera.—Hypotension is the rule. Low blood-pressure during the stage of collapse is a very valuable guide to the need of transfusion. The blood-pressure is always below 100. The most satisfactory treatment, or the one most likely to combat complications, such as uremia, is the intravenous injection of a pint of 1 to 250,000 (equals 5 mm. of a 1 to 1000) solution of adrenalin. By this means the death-rate was reduced almost one-half.[††]

Cerebral Spinal Meningitis.—Robinson[‡] noted that blood-pressure was usually high during the acute stage and in those showing severe symptoms, and was low in mild cases and in convalescence.

Sophian[‡‡] depends absolutely on the sphygmomanometer as a guide to the value and safety of lumbar punctures and serum injections.

.Other infections, in which the pressure is usually low, are diphtheria, scarlet fever, measles and acute rheumatism. Here the sphygmomanometer may be of value in diagnosis, prognosis and treatment.

Miscellaneous Conditions.—A condition of hypotension usually exists

*Edin. Med. Journ., January, 1908.
**Edin. Med. Journ., 1910.
†Therapeutic Gazette, June, 1910.
††Leonard Rogers (Therapeutic Gazette, November 15th, 1909).
‡Arch. Int. Med., May 5th, 1910.
‡‡Journ. Amer. Med. Assoc., March 23rd, 1910.

in all wasting diseases and cachectic states, and is commonly seen in carcinoma and general paresis. In these conditions it is a natural result of the gradual failure of function in the entire body, which includes a weakening muscular system, a gradually lowering vasomotor tone, and a diminution in the quantity and quality of the blood.

In diabetes the pressure is usually subnormal, unless complicated by nephritis and arteriosclerosis.

In Addison's disease the blood-pressure is extraordinarily low because of the destruction of the suprarenal glands.

In epileptic coma the blood-pressure is always low. Here it constitutes a valuable differential sign between this condition and uremia.

The chief practical value of the sphygmomanometer, in the light of our knowledge of hypotension, is the valuable aid derived, both for differential diagnosis, prognosis, and as a guide for treatment. It alone can give timely warning of the onset of the hypotension, accompanying vasomotor paralysis from shock or any other cause. In acute disease the blood-pressure test should be taken daily. This is easily accomplished in a minute's time with the author's Pocket Sphygmomanometer, as shown in the accompanying illustration.

The whole instrument is extremely simple and easy to use; is complete, including carrying case; will easily slip into the pocket, or occupy but little room in the physician's bag.

Effects and Danger of Hypotension.—The direct effects of a falling blood-pressure are the accumulation of an abnormal amount of blood in the veins, and a lowering of the current in the arteries. This will affect the capillary circulation and interfere with nutritive and secretory processes which depend on it. The most dangerous is its effect on the heart, as it has been shown that complete loss of vasomotor tone soon leads to death, because of the gradual accumulation of nearly all the blood in the body on the venous side; hence, the heart has nothing upon which to act.

"Low blood-pressure due to general prostration is not to be regarded as a disorder of the circulation, except in so far as the circulation fails to respond to the demand made upon it. Thus in shock, it is the nervous system that is at fault, not the circulatory apparatus" (Bishop).

SOME OBSERVATIONS ON THE DIAGNOSIS AND TREAT-
MENT OF SYPHILIS IN PREGNANCY.

By Robert H. Davis, M. A., M. D., of St. Louis,
Instructor in Dermatology and Syphilis, Washington University.

The old question, as to whether a luetic father could transmit the
disease to his offspring without infecting the mother, has had great light
thrown upon it by recent Wassermann tests made on such mothers who
were clinically free from the disease.

In a series of 381 such cases collected by McIntosh and Fildes.* 76
per cent. gave a positive Wassermann reaction, so that it is probable
that all such mothers are luetic, the syphilis, of course, being usually
latent. This explains the immunity hitherto accepted, the misinterpre-
tation of which occasioned Colles's law.

Of this series, 196 mothers, who had luetic children, but denied syphilis,
and had no symptoms, were even more carefully examined than the rest,
and 145 gave a positive Wassermann reaction. The stage of syphilis in
the father or mother at the time of conception may or may not have in-
fluence on the severity of the infection in the child. However, in late
tertiary, and what some authors call late latent lues, the child may es-
cape. A luetic father, though, may beget a healthy child, and the mother
show no signs clinically of the disease, though usually the Wassermann
reaction is positive.

In a series of 24 such children lately reported, who gave negative Was-
sermann tests at birth, 17 remained healthy as far as known; 5 developed
lues within six months, and the remaining 2 died during this period of
intercurrent affections.

If the mother is infected shortly before the conception, the child
will be luetic, unless treatment is instituted and carefully carried out.
It used to be thought that if the mother was not infected by the sixth
month of pregnancy, the child would escape, but a case is on record
where the mother was infected in the eighth month, and bore an infected
child. The prognosis for the mother does not vary from that in women
generally—that is, they are less liable than men to parasyphilitic lesions.

The cutaneous symptoms of syphilis in pregnant women are, of
course, the same as those in others, and such a one with the well-known
primary lesion, or the macular, papular, or pustular eruptions, offers
little difficulty in diagnosis.

In the case of a primary lesion especially, it is well, and often neces-

* Syphilis from the Modern Standpoint, p. 141. 1911.

sary, to verify the diagnosis by finding the spirochæta pallida. It must be remembered, however, that in pregnancy syphilis is often latent. The primary and secondary stages may have escaped the patient's attention, and a tertiary lesion may not have evidenced itself. A history of one or more miscarriages is, of course, suspicious, but should not alone be the reason for insisting on commencing treatment. An intermittent fever in the later months of pregnancy has been pointed out by Taussig,* of St. Louis, as being often of syphilitic origin.

We have now in the Wassermann test a method of diagnosis, whose positive results are very reliable when the test is performed by a properly qualified man. Non-luetic conditions giving a positive test would seldom confuse, and especially seldom in pregnancy.

In doubtful cases with vague histories, or primiparæ with suspicious eruptions, this test is almost obligatory. If positive, treatment should be at once instituted. If negative, and the pregnancy is in the first three months, the test should be repeated in a month, especially should suspicious lesions appear or persist. If the patient was at one time luetic and received mercury or salvarsan, or both, and especially if the infection was more than three years before, and there are no symptoms—the so-called late latent cases—one negative Wassermann reaction is by no means reliable. If such cases were untreated or poorly treated, however, the test is usually positive.

It is to be hoped that a valuable aid to diagnosis will be furnished in luetin, originated by Noguchi, and reported by him in the *Journal of Eperimental Medicine* for December, 1911. This is an emulsion, or extract, of pure cultures of treponema pallidum, and is injected (.05 c.cm.) in the superficial layers of the skin, if possible between the cutis and epidermis. If the reaction is negative, after twenty-four hours a very small erythematous area appears at and around the point of injection. There is no pain, nor itching, and usually in forty-eight hours all inflammation is gone and no induration remains. A slight papule may occur which commences to recede in seventy-two hours, and leaves no induration.

If the reaction is positive, there may be a papule appearing in twenty-four to forty-eight hours. This is large (5 to 10 mm.), raised and red, and may have a red zone around it. The induration increases for three or four days, and then gradually disappears, being gone usually in a week. Another positive reaction is evidenced by a pustule forming as a later stage of the papular reaction, on the fourth or fifth day. Or there may be a pustular reaction, delayed to the eighth or tenth day, which he calls a positive torpid reaction. This last is rare.

This test seems very reliable in latent and tertiary cases; less so than the Wassermann test in the primary, secondary, and paraluetic stages. The Wassermann reaction is more directly and immediately affected by treatment than is the luetin reaction. Should this first report be the

precursor of others, showing as good or even better results, and should the luetin, in time, be easily obtainable, it will be a great aid in diagnosing lues of pregnancy, for latent cases are especially met with in this condition.

It may not be amiss to call attention at this point to several skin diseases that may confuse the general practitioner. Psoriasis is quite common in pregnant women. This disease is differentiated by its silvery scales, lack of infiltration, predilection for the extensor surfaces, and the history of repeated attacks.

Eczema is quite common at this period, but usually offers no difficulty in diagnosis even in the papular form, being differentiated by its redness, itching, lack of infiltration, localization, and history. Lichen planus may be general, and also occurs on the flexor surfaces, but shows usually glazed, often umbilicated, angular papules, with a violaceous tinge. This disease often yields to mercury or arsenic; hence, if the therapeutic test were applied, it would cloud the diagnosis.

Seborrheic dermatitis is slightly greasy, not symmetrically distributed; there is little or no infiltration, and seborrhea of the scalp is usually coexistent. This condition on the palms, however, may require the Wassermann test to differentiate it from a palmar syphilide.

The treatment of syphilis in pregnancy is the same as that in other cases. It would obviously be out of place in a paper of this sort to enter into an extended discussion of the treatment of the disease. The generally accepted rating of the mercurial methods is: (1) Injections, (2) inunctions, and (3) oral. There is probably little difference in efficacy between inunctions, properly carried out, and injections, whether of soluble or insoluble preparations. In fact, it has been lately reported that inunctions will change a positive Wassermann reaction quicker than injections. Of course, iodide of potash should be combined with mercury in appropriate cases, and a tonic simultaneously administered often enables us to overcome a hitherto rebellious case.

The reports on the use of salvarsan in pregnant syphilitics have been few compared to those on its use in other cases. Lesser, Michaelis, and Spiethoff say that pregnancy is not a contraindication to its use, and von Zeisl adds that "because of the rapidity of its action, it seems especially suited to syphilitic pregnant women with a view to the prevention of abortion and the delivery of a sound child." It has been given as late as the eighth month, but should, if possible, be given early, and followed with a second dose, or with mercury if a positive Wassermann reaction persists. One method is to start with mercury, give vigorous inunctions or injections to the point of saturation, and then administer the salvarsan.

The following of salvarsan with mercury, or vice versa, seems reasonable and efficacious, despite the fact that the opponents of this newer remedy claim that it is "an attempt to break its fall with a parachute

of mercury and the iodides." As to the length of time that treatment should be continued, in view of the fact that the effect on the child cannot be determined short of birth, the mercury should be administered throughout the pregnancy, regardless of the Wassermann reaction. Except in this condition, the length of treatment should be controlled by the Wassermann test. Two plans are put forward prominently.

McIntosh and Fildes* say that a quantitative result should be the guide, especially in primary and secondary cases. If monthly tests show a reaction that is decreasing, the treatment is efficacious; if not, the treatment should be strengthened or changed. When the test becomes negative, treatment should be stopped to be resumed only when, or if, the test becomes again positive. Otherwise,. mercury-fast spirochætæ are more liable to be produced.

The other plan is to carry out the usual intermittent treatment for two or three years, regardless of the Wassermann tests, and then stop; after one month have the test made, and, if negative, repeat it in six, and twelve or eighteen months. After energetic treatment for two years, especially if begun early, one-half to two-thirds of all cases give a continuously negative test.

Now, finally, the report of a few typical cases will illustrate. Bar** reports ten pregnant women treated with salvarsan. The same clinical results as usual were observed. The Wassermann reaction either became negative soon, or sometimes more strongly positive immediately, and then weakened and became negative later. At first, he gave 5 dgrm. intravenously, but concluded that this amount might endanger the child by endotoxins, so he now gives 2 dgrm., and repeats the dose once after six days.

A negative Wassermann reaction in the mother does not guarantee the child to be without taint. Two children, whose mothers received only a single injection and gave a negative test after it, showed lues at birth. There were no bad results except that one woman had a severe transient albuminuria. He concludes that an inefficient dose, unless a second adequate dose is given, or the first followed with a course of mercury, may stimulate the disease.

Langes† reports eight pregnant women treated with salvarsan in the last three months of pregnancy; the Wassermann reactions were positive, the lues latent. Only one injection was given. In none of the women did the injection cause the advent of labor pains. All the children were born apparently healthy, and gave negative Wassermann reactions. He believes, however, that salvarsan should be followed up with mercury.

Aza†† treated eight pregnant luetics, who gave positive Wassermann

*Syphilis from the Modern Standpoint, p. 163, 1911.
**Semaine Médicale, November 8th, 1911.
†Wien. med. Wochenschr., No. 20, 1911.
††Abs. British Med. Journ., June 28th, 1911.

reactions, with salvarsan, intravenously, the dose being 4 to 5 dgrm. Six went to full term; the pregnancies were afebrile; there were no unfavorable effects to either mother or child, and the children were normal and apparently healthy.

Browning* reports giving a woman with secondary lues, who was six months pregnant, 4 dgrm. of salvarsan intravenously, and he repeated the dose in five weeks. An apparently healthy child was born at full term, and six months later neither mother nor child showed or had shown luetic symptoms.

The results of the treatment of such cases with mercury are well known. For example, a woman in our service at the Washington University Hospital, was under oral treatment for active secondary lues. She became pregnant. The treatment was intensified, and she was delivered at term of an apparently healthy child, who, at last report, remained well, some four months after birth.

Dr. Joseph Grindon, of St. Louis, allows the writer to report a case of his which is so interesting that it is given here in detail:

E. H., female, married, *aet.* twenty-eight, developed a sore on upper lip in August, 1897, which remained open three months. Neighboring glands were much swollen. About October 1st, while sore was still unhealed, she became pregnant for the first time, and presented herself at the out-clinic of the St. Louis Mullanphy Hospital, March 5th, 1898.

There was a large patch of the tubercular syphilide over the right scapula, a smaller one over the left. Similar patches occupied the right arm and forearm; some were scattered over the thighs, and one was on the left knee.

Treatment with mercury and iodide of potassium was at once begun, but for the first six weeks there was little improvement. After this the lesions slowly faded, but an ulcer formed on the left leg, and continued to deepen until her confinement about July 1st, after which it rapidly healed.

Active treatment was continued, but in August a tubercular patch appeared on the left side of the nose. In the first week of October she began to have intense headaches, which persisted, despite reinforced treatment, until the middle of December, and were followed after a month's respite by a vague sense of unrest and irritability. Treatment was faithfully pursued until the following September, and then suspended for several weeks, whereupon two small lesions appeared on the left knee.

In March, 1900, after another intermission of treatment, two gummata formed on the forehead, near the hairy margin, one of which ulcerated, and was slow in healing. In September, 1900, she gave birth to her second child, a girl, the first having been a boy.

In April, 1901, the patient developed right facial paralysis, involving the orbicularis, frontalis, cheek muscles, and levator palati. Vision was blurred in the right eye, and she suffered from subjective sounds of music, bells, etc.; worse in right ear. These symptoms improved and in sixty days disappeared under mercury and iodide of potassium.

In September of the following year there were headaches, sense of confusion, and nervous irritability; these disappeared in one month under antiluetic treatment. A few weeks later she developed headache with feeling of constriction at vertex, twitching of right side of face, and pain at left knee. These symptoms again yielded to treatment.

*British Med. Journ., September 23rd, 1911.

In November, 1906, another girl was born. Two other children were born subsequently, who were healthy at birth and have remained so since. In January, 1908, patient complained of great nervous irritability, weakness and ill-defined sense of fear coming on every morning, and was again relieved by specific drugs. In March, 1910, disturbances of sense of position, and vertigo occurred. These symptoms yielded to treatment, but returned in November, 1911, accompanied by headache and loss of memory. At present, February, 1912, she is fairly comfortable under treatment.

Her husband first came under observation in January, 1903, with an ulcerating gumma of the nose. He gave no clear account as to date of infection.

The foregoing history shows an unusually virulent syphilis, but treatment was actively pushed during each pregnancy; and, apparently as a result, there were no abortions. The children, who have been frequently observed, are unusually healthy looking and furnish only the following clinical notes:—

The oldest, at one month, showed a hydrocele which disappeared under mercury. This is mentioned by Taylor* as an occasional sign of hereditary lues. This child has well-marked scaphoid scapulæ. The second child has them less characterized, and the third least. There have been no other luetic phenomena in any of them at any time.

---

*The Pathology and Treatment of Venereal Diseases, p. 947, 1895.

INTERNAL URETHROTOMY AND URETHROTOMES.

By H. McClure Young, A. B., M. D., of St. Louis,

Instructor in Surgery in the St. Louis University School of Medicine.

The operation of internal urethrotomy has long suffered from the multiplicity of instruments necessary to its performance, and the very technical knowledge required of the surgeon who would use them properly. Also there has remained a hiatus in our armamentarium so that the surgeon, no matter how perfectly equipped, has found himself unable to operate with sufficient accuracy and thoroughness on a large class of strictures. To make his meaning clear, the writer proposes to discuss in some detail the merits and limitations of the various urethrotomes hitherto available.

Urethrotomes may be divided into two classes: Those which divide the stricture from before backward, and those which divide it from behind forward. In the nature of things a urethrotome designed to divide a stricture from behind forward is suited only to such strictures as will admit the passage of whatever cutting apparatus the instrument may be provided with, as we cannot get our knife into action until we have first passed it through and lodged it behind the uncut stricture. This limits the usefulness of such instruments very decidedly, for while they possess certain undoubted advantages, they are practically not applicable to strictures of a calibre less than 18 French.* Bearing this limitation constantly in mind, let us consider these instruments severally and see in what other respects each one leaves something to be desired. They are all based on the same principle—namely, (a) the introduction of a hidden knife to a point behind the stricture; (b) its disclosure and passage through the cicatricial tissue; (c) its retirement to its original hiding place during the withdrawal of the instrument. The object aimed at is, of course, the radical division of the stricture without infliction of trauma upon the sound urethra in front of and behind it. But if we are to accomplish this purpose, our instrument must be provided with some sort of finder or mechanism for locating the exact points requiring incision. It is of but little advantage that we can disclose or conceal our knife at will, unless after introducing our instrument we are able to tell when its disclosure or concealment is indicated; and it is just here that some otherwise excellent instruments are at fault. The Otis is in America probably the most popular, but it fails in this respect most

---

*The instrument of Albarran forms an exception to this rule, but as this instrument may also be used to divide a stricture from before backward, it will, for convenience sake, be considered later in the article.

signally. It is, it is true, provided with a dilator so that the surgeon can tell when he has accomplished his purpose and has restored the urethra to normal calibre; but no dilator will enable him accurately to place his knife before disclosing it, and he will therefore blindly incise a certain amount of healthy urethra in addition to the strictured area. This is almost certainly what happens every time the instrument is used.

Kollmann saw this defect in Otis' instrument, and accordingly added to it two small olives between which the knife should lie. It now becomes a comparatively simple matter to place the stricture between these two olives and draw our knife through it. But the instrument, so modified, is of still larger calibre, and can, therefore, scarcely be expected to have any very broad sphere of usefulness.

Kollmann's own instrument is far superior. It consists of a straight rod with an olive at the distal end in which the knife lies concealed. A series of interchangeable olives from 18 to 32 French are delivered with the instrument, and the surgeon selects the largest olive which can at all conveniently be passed through the stricture. He then inserts his instrument and withdraws it until he encounters resistance which informs him that his olive lies firmly against the posterior orifice of the stricture.

Fig. 1.—Kollmann's modification of Otis' Urethrotome.

He now, by means of a mechanism in the handle, advances his knife, withdraws the instrument until resistance ceases, lowers his knife again and ceases momentarily his operations. It will be seen that he has divided the stricture, the whole stricture and nothing but the stricture, and, furthermore, should there be two strictures, he can divide them in turn without damage to the intermediate sound urethra. But in practice the surgeon will not stop here. He will now change his olive for the one of the next larger size and repeat his operation, making this incision somewhat laterally to his original cut, and this he will repeat again and again, until he has reached the largest olive bringing the calibre of the urethra up, let us say, to 32. The idea is to make many shallow incisions parallel to each other instead of one deep one, and the advantage of such a procedure is obvious. A shallow incision when it gapes will present but a small area to be covered by epithelium, and several such incisions, with sound epithelium between them, may be expected to epitheliate over as quickly as one, whereas one deep incision gaping widely will heal much more slowly, will lead to a vastly greater formation of scar tissue, and offers therefore necessarily a smaller chance of freedom from inconvenience in the future.

Such then, will be the technique of internal urethrotomy with the Kollmann urethrotome as applied to strictures of large calibre in the anterior urethra. It would appear ideal where applicable, but as already pointed out the stricture must have a calibre of at least 18 French and the smaller strictures must first be brought up to this size. The Kollmann instrument is also not applicable to strictures of the membranous urethra, for the reason that this portion of the canal lies at an angle to the perineal and is also firmly fixed in the grasp of the cut-off muscle. It is very desirable, therefore, to employ here an instrument which will straighten out the canal and allow us to pass our knife along it in a direct line while making the incision. Strictures of the bulbous urethra are also scarcely to be divided with this instrument, for the reason that the surgeon may have difficulty in determining whether his olive lies as intended behind the stricture, or has possibly been introduced too far and is lodged behind the cut-off muscle. It is often difficult to determine the exact location of these deep strictures, and for the purpose of urethrotomy, therefore, they must all be classed with strictures of the posterior urethra.

These are all the instruments of this class that we need to consider.

Fig. 2.—Kollmann's Urethrotome.

Others may occasionally be encountered, but they will do nothing more than those already described, and will generally be found to be inferior to them. Civiale's urethrotome, for example, is in principle that of Kollmann, but it is not so good, for the reason that it has but one olive instead of an interchangeable series.

And now let us pass to a consideration of the other class of urethrotomes—namely, those which are designed to divide a stricture from before backward. A moment's consideration will convince us that the ideal instrument of this type should fulfil the following conditions:—

1. It should be so constructed as to permit its introduction through a stricture admitting only a filiform.

2. It should be so constructed as to permit the surgeon to pass his knife down to the seat of the stricture without damage to that portion of the urethra lying anterior to it.

3. It should be provided with some mechanism for informing the surgeon when he has completely divided the stricture in order that he may not do damage to that portion of the urethra lying posterior to it.

The importance of these three features will be apparent at once, and

yet an examination of the instruments upon the market will convince us that not one of them completely fulfils the requirements. We shall consider but two instruments, as the writer knows of but two that are at all capable of introduction through the narrower strictures—namely, the urethrotome of Albarran and that of Maisonneuve with its modifications. And yet both of these leave considerable to be desired. Let us consider first the instrument of Maisonneuve on account of its being the better known. This is indeed a marvel of simplicity, lightness and strength. It consists of a grooved staff onto the end of which may be screwed a filiform guide. The blades are triangular in shape and attached to the end of a long stylet by means of which they can be thrust downward along the groove of the instrument. The angle or uppermost part of the blade is blunt, and it is claimed that this blunt tip enables the knife to slide along the normal urethra without infliction of trauma; whereas, as soon as a constriction is encountered, this, by its own resistance, is drawn tense across the sharp blade and thus divided. The ingenuity of the man who introduced this simple device is beyond praise, and yet it
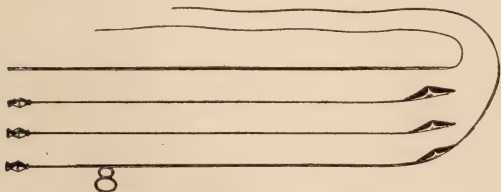
Fig. 3.—Maisonneuve's Urethrotome.

certainly does not fulfil all the conditions necessary to an ideal instrument as heretofore outlined. In the first place, as to its introduction into the narrower strictures, it is, it is true, provided with one or two beautiful woven filiform guides tipped on the proximal end with a screw of a very fine thread for secure attachment to the staff of the instrument. It appears to be assumed that the surgeon can, with his marvelous deftness in all cases, immediately engage any filiform that he may choose, and the subsequent introduction of the staff follows without a hitch in logical sequence. An unnecessary amount, however, is left to the deftness of the surgeon. In practice most of us are content in difficult cases, if, after an hour's work, we succeed in engaging any filiforms whatever, We may start out very confidently with these elegant and rather too pliant guides with which our instrument-maker has provided us, but soon losing patience, we turn to our whalebone bougies. We fill the urethra with half a dozen of these, try them all in sequence many times; and when at last one of them to our surprise glides forward into the bladder, we feel ourselves masters of the situation. But we are no nearer the introduc-

tion of the Maisonneuve urethrotome than we were before. Instrument-makers would appear to have entered into a sort of conspiracy, and with one accord they supply these instruments without any provision for passage over a whalebone bougie. An extra-tunnelled tip could easily be provided, and we should then be enabled to convert our staff into something very like the ordinary tunnelled sound. This change in the instrument is so simple, and the necessity for it so obvious, as to make it seem strange that surgeons should so long have put up with the inconveniences attached to the instrument as at present delivered. We should, of course, insist that our instrument be so made that the staff can be threaded over an ordinary whalebone bougie, and, if anybody wishes woven guides with screw attachments, they can be readily delivered in addition.

But the Maisonneuve urethrotome has another and less easily circumvented fault. It is not true that the ingenious little knife cannot inflict trauma upon the sound urethra, but, on the contrary, it may be expected
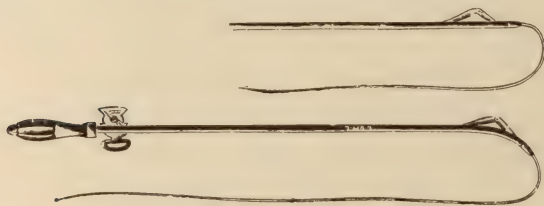
Fig. 4.—Albarran's Urethrotome.

to do so. It was to overcome this defect that Tevan introduced his modification whereby the blade is introduced, protected by a sort of hood, from which it is advanced only when resistance is encountered. This was a needed alteration, and it seems strange that it has not come into more general favor.

Finally, in using the Maisonneuve urethrotome it is impossible for the surgeon to know when his knife has reached the posterior limit of cicatricial tissue, and he may be expected in most cases to prolong his incision unnecessarily. Indeed, many surgeons carry the knife, as a matter of routine in all cases, entirely through the urethra into the bladder, thus dividing, of course, the membranous urethra, firmly grasped as it is by the compressor urethra muscle. From this there is no escape, and yet who will claim that the cutting of a previously healthy membranous urethra is a matter of small moment? Strictures in this region are easily induced and are the most perplexing that we have to treat. Why, therefore, inflict unnecessary damage upon this most delicate part of one of the most delicate canals in the human body? Were it not better to accom-

pany our knife with a good-sized olive into which it might be withdrawn, and which would serve to test the permeability of each portion of the urethra as we advance before making our incision?

The instrument of Tevan is not often seen in America, but from the description of Huebother it would not appear to meet the condition. The hood with which the blade is covered is angular, and might, it would seem, become entangled in the freshly-cut cicatricial tissue, thus preventing its further advancement. If passed into the bladder, its shoulder might easily catch upon the cut-off muscle, thus preventing its withdrawal. It is also incapable of smoothly distending the urethra, as would be done by an olive.

Albarran, in the construction of his instrument, has had in mind principally the second of the three conditions already outlined, viz., the sparing
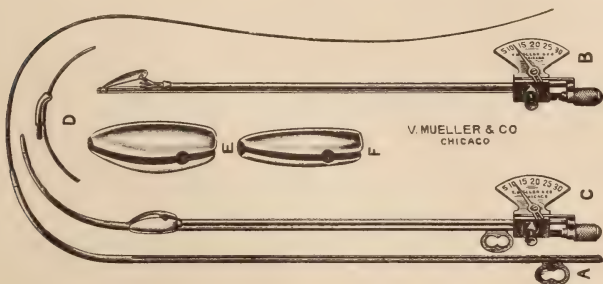
Fig. 5.—Author's new Urethrotome.
A. Grooved staff.
B. Cutting apparatus.
C. Cutting apparatus inserted into grooved staff and olive adjusted.
D. Extra tip for introduction over a whalebone bougie.
E. and F. Olives.

of the sound urethra anterior to the stricture. Seeing the disadvantages of the solid triangular blade of Maisonneuve, he has constructed his knife out of two narrow blades placed end to end and hinged together. When introduced these blades lie hidden in the shaft of the instrument, but by means of a mechanism in the handle they can be flexed upon each other at the will of the operator, thus forcing the hinged point upward and exposing the blades. This instrument, like the Maisonneuve, is provided with one or two woven filiform guides, but it cannot be introduced over a whalebone bougie.

In addition to its fragility this instrument has the great disadvantage of possessing no mechanism whereby the surgeon can accurately locate the point of narrowing before bringing his blades into action. The en-

tire apparatus is of a uniform calibre except when the blades are elevated for cutting, and no matter how carefully the surgeon may have attempted to determine the point and extent of the stricture with other instruments before the operation, he is, nevertheless, at a great disadvantage, and will almost certainly be tempted to incise blindly over a greater extent than is necessary, and may even then leave unsuspected cicatricial tissue uncut; the instrument is intended for the division of the narrower strictures; and the surgeon, who has once succeeded in passing it through one of these, is not likely to withdraw it until he is certain that all constricted area has been slit. Repeated attempts, and between them a testing with sounds or acorns to see what has been accomplished, will not be in order. We must do our own work completely at one sitting and with the fewest delays or interruptions possible.

And just here we have the explanation of the continued popularity of the Maisonneuve instrument. It does the work radically and with a single sweep of the knife. The instrument of Albarran, as at present delivered, can never replace it. It is much too feeble, halting and inaccurate. We must have a tool which will certainly, beyond peradventure, divide the stricture and all the stricture whatever else it may divide.

And now having considered all these instruments severally, let us for a moment review just what can be accomplished by the surgeon who possesses them all, and is thoroughly versed in their uses and their limitations. In the first place, he can, with Kollmann's instrument, divide strictures of large calibre situated in the anterior urethra in front of the bulb, with great accuracy and thoroughness. But these are the only strictures on which he can perform anything approaching the ideal urethrotomy. Strictures of large calibre situated in the posterior urethra or slightly anterior to it, can be divided with Otis' urethrotome without damage to that portion of the urethra lying in front of them, but only at the cost of considerable trauma to the more important part of the urethra which lies behind them. Strictures of small calibre in the anterior urethra can, with Tevan's instrument, be divided without injury to that portion of the urethra lying anterior to them, but there will still be danger of leaving uncut strictures not suspected lying behind them. Narrow strictures of the posterior urethra cannot, with any of these instruments, be divided with a satisfying degree of accuracy and its concomitant conservatism. It can scarcely be denied, therefore, that something more is needed. Let us now proceed to a consideration of the writer's instrument.

It consists of (a) a grooved staff precisely similar to that of the Maisonneuve urethrotome, except that it is provided with an extra tip through which there is a small tunnel, thus enabling the surgeon to pass the instrument into the bladder over a whalebone bougie. The groove for the knife is not carried out onto the curved part of the instrument. (b) The cutting apparatus consists of a hinged knife similar in principle to that of Albarran's instrument, but protected during introduction by a

small tapering olive which fits snugly over the grooved staff. This olive, being detachable, any size from 20 to 32 may be employed.

The illustration shows clearly the details of construction, but the method of procedure may bear a brief description. Having first introduced our grooved staff into the bladder, we then pass our cutting apparatus, knife concealed, down along the groove to the seat of the stricture. Here our olive meets with an obstruction, and we now advance our knife by means of a simple contrivance in the handle. Holding our staff firmly, we now advance our entire cutting apparatus further until resistance ceases or becomes greatly diminished, when we again lower our knife. We then advance further, testing with our olive the entire urethra, and dividing any further strictures that may be discovered. We may enter the bladder if we wish. As the olive is tapering it has no shoulders to catch upon the cut-off muscle and interfere with its withdrawal. The entire cutting apparatus is now removed as it was introduced, with the knife concealed, the grooved staff being held firmly in position throughout our manoeuvers.

Let us grant that the surgeon has been working with the smallest olive No. 20. He may now exchange this for one of larger size, and make another incision, this time laterally, and this he may repeat until he has brought the urethra up to such calibre as he may elect. Not until he has finished with this will he remove the grooved staff.

It will be seen that one is enabled with this instrument to place his incisions with great accuracy, sparing the sound urethra both in front of and behind the stricture. It is suited to strictures of the narrowest calibre, and to strictures both of the posterior and anterior urethra. It enables the surgeon also to make multiple shallow parallel incisions instead of one deep one, so that it possesses all the advantages claimed for the Kollmann instrument. In fact, it would appear to be universally applicable; and while it is admitted that for strictures of large calibre in the anterior urethra, the Kollmann instrument is not to be excelled, still it appears that even here our apparatus would serve equally well, thus relieving the surgeon of the necessity of carrying a variety of instruments, and then seldom having one that can be relied upon to accomplish just exactly what he wishes. Indeed, it is this chaos of instruments which is probably more than any other one thing responsible for the neglect into which the operation of internal urethrotomy has fallen. It even appears that many surgeons have but a hazy idea as to the classification of instruments, and as to the conditions which the several varieties are intended to meet. In an emergency, therefore, finding themselves not provided with the apparatus suited to the occasion, they turn at once to external urethrotomy, as the simplest solution of their difficulties. And yet the advantages of the internal operation, where applicable, are unquestionable, and have often been emphasized. Albarran reserves the operation of external urethrotomy for those cases in which he intends

to resect a portion of the urethra. Keyes insists that many strictures classed as impassable would in reality yield to coaxing measures, undertaken with sufficient tact and patience. He even recommends in selected cases when dealing with acute retention, the suprapubic aspiration of the bladder at eight-hour intervals for one day, after which he says we may succeed in passing a filiform bougie. He appears to prefer internal to external urethrotomy, however, only when dealing with strictures of the anterior urethra. In this he is decidedly at variance with the best opinion of continental surgeons. The truth is that external urethrotomy probably owes its popularity in America to its simplicity and directness, and to the fact that it requires no special armamentarium, or special technique. The general surgeon in particular grows impatient when called upon to exercise infinite care in conducting fine instruments through a narrow urethra; and a perineal section, especially when combined with a suprapubic cystotomy and retrograde catheterization, appeals to him at once as a sparer of his time and possibly also of his dignity. But it is the writer's belief that internal urethrotomy could and should be performed much more often than it is, and that it offers prospect of a more rapid convalescence, and a better ultimate prognosis, than external urethrotomy. Indeed, it appears obvious that all that is needed is a simplification of instrumentarium and technique to bring the operation into that favor which its advantages deserve.

To sum up, it is claimed for this urethrotome that (a) it is a universal instrument enabling the surgeon to do away with all other urethrotomes, and thus to be sure that when called in an emergency, whatever condition he may find, he will be provided with the instrument of choice. (b) It enables the surgeon to perform the operation ideal for the given case, on all strictures wherever located and of whatever calibre provided only that they are not impermeable to a filiform guide. (c) It enables the surgeon to place his incisions with the utmost accuracy, sparing absolutely the sound urethra, and dividing with certainty and completeness all strictured areas. (d) It broadens greatly the field of conservative surgery in the urethra, enabling surgeons in general to do away with a vast amount of technical knowledge as to the various urethrotomes and their purposes, and with a minimum of special training to do a simple, accurate and complete operation, thus reducing greatly the number of haphazard mutilating urethrotomies and perineal sections.

BIBLIOGRAPHY.

Guiard: New Method of Internal Urethrotomy. (*Annales des Maladies Génito-Urinaires,* p. 401, 1908.)

Œsterreicher: Internal Urethrotomy. (*Wien. klin. Wochenschr.,* No. 47, p. 1240, 1905.)

Watson and Cunningham: Internal Urethrotomy in the Treatment of Strictures of the Membranous Urethra. (*Medical Record,* No. 66, p. 370, 1904.)

Huebother: Internal Urethrotomy. (*Deutsch. med. Wochenschr.*, No. 24, p. 1116, 1911.)

Goldberg: The Modified Maisonneuve Urethrotome. (*Zentralbl. fuer die Krankheiten der Harn- und Sexual-Organe*, No. 12, p. 539, 1901.)

Albarran: Médecine Operatoire des Voies Urinaires. Quoted by Huebother.

Batut: The Treatment of Urethral Strictures. (*Annales des Maladies Génito-Urinaire*, p. 97, 1910.)

Keyes: Genito-Urinary Diseases. New York. 1906.

Frank: Personal Communication.

SYPHILIS OF THE STOMACH, WITH A REPORT OF TWO CASES OF SYPHILITIC TUMORS.

By Jesse S. Myer, A. B., M. D., of St. Louis.

There is a marked difference of opinion among writers as to the frequency with which gastric syphilis occurs. Chiari found in a careful analysis of 243 autopsies on syphilitics—145 hereditary and 98 acquired—but 2 cases of syphilis of the stomach. Stolper, in 86 autopsies on syphilitics, found but one case. Rudniew, on the other hand, goes so far as to say that in most syphilitic subjects gastric syphilis is present in some form and in some stage, saying that in the exanthematous stage the same eruption exists in the stomach as on the skin. Lang maintains that 20 per cent. of gastric ulcers are of syphilitic origin, while Engel states that from 10 to 15 per cent. are due to this cause. Barbier, in 1901, collected 56 cases of gastric lues which were demonstrated at autopsy, and Finkler, in 1902, describes 16 cases of syphilis of the stomach which were carefully worked up clinically and pathologically. According to Newman chronic gastritis is one of the most important visceral conditions of syphilis, often accompanying involvement in other organs, and is one of the manifestations of the tertiary stage. It differs clinically from ordinary cases of chronic gastritis by its response to antiluetic treatment. The same writer believes that 20 per cent. of the round ulcers are in syphilitic individuals, and that they develop not only from gummata which break down and ulcerate, but also from the same cause as do the non-specific cases—namely, erosions, endarteritis, diminution in hemoglobin and a decrease in alkalinity of the blood. He also calls attention to gastric hemorrhage of syphilitic origin, due to a so-called hemorrhagic diathesis. In addition to these conditions, Einhorn recognizes syphilitic pyloric stenosis. The recognized syphilitic affections of the stomach, then, are syphilitic ulcer, syphilitic neoplasm or gummata, syphilitic gastritis, syphilitic pyloric stenosis, and gastric hemorrhage of syphilitic origin. Chiari divides these conditions into those of direct and indirect syphilitic origin. Those of direct, he maintains, are very rarely met with and are either gummata, or syphilitic infiltration of the stomach. A gumma may break down and become digested by the juices and thus indirectly result in a peptic ulcer. Gastritis of luetic origin is similarly indirect, being due to circulatory disturbances, passive congestion, hemorrhages, etc. produced by luetic involvement of other organs, such as the liver.

The diagnosis of luetic chronic gastritis offers many difficulties, and, like many other luetic conditions, depends after all upon the therapeutic

test. Hemmeter believes that, if syphilitic lesions exist in other abdominal viscera, an accompanying gastritis may logically be considered of luetic origin. We must not forget, however, that those exposed to luetic infections are likewise exposed to the other vices which so often result in chronic gastritis. After all, the best test is the application of the therapeutic test. Even normal stomachs do not tolerate iodides well, and least of all a diseased stomach. In the writer's experience chronic gastritis is the condition in which iodides are least tolerated. Though he has never cured a case of chronic gastritis, pure and simple, with iodides, he agrees with Hemmeter that a case of gastritis that is cured by iodides must be of syphilitic origin, but in this case the gastritis yields only after the lesion responsible for its development has been influenced.

In the writer's experience syphilitic ulcers of the stomach have not been very frequent, and he certainly cannot agree with those who place the percentage as high as 10 to 20 per cent. He can find in his records but 2 cases of ulcer that responded to antispecific treatment so promptly as to justify a diagnosis of syphilitic ulcer. One of these was in a young man whose symptoms of ulcer were perfectly definite and for a long time perfectly typical. After a considerable period the pains became exclusively nocturnal so that every night, at about 11 o'clock, he was compelled to walk the floor "doubled up with pain" for an hour or more. He had denied lues; no reason for suspecting it was revealed by the physical examination; and nocturnal pain was the first and only clew. The patient thrived on iodides and made a prompt recovery. After this, as is so often done following an individual case, the writer used iodides in a large number of cases, and of late has given iodides in some ulcer cases with positive Wassermann or Noguchi reactions, but has not been so fortunate as to meet with a similar case. Unfortunately the symptoms and clinical manifestations of syphilitic affections of the stomach do not, as a rule, differ from those of other affections of the stomach. Therefore, syphilitic ulcer, syphilitic gastritis, and gummata simulate, in every particular, ordinary round ulcer, the usual form of chronic gastritis, and carcinoma of the stomach, respectively.

Whatever may be the frequency of syphilitic lesions of the stomach, direct or indirect, it seems pretty generally conceded that syphilitic tumors of the stomach are either very rare or have been very rarely recognized. In his excellent and exhaustive work on the diagnosis of abdominal tumors, Sacconaghi states that he is aware of but 8 cases of circumscribed, palpable syphilitic tumors of the stomach reported in modern literature, and cites the cases of Dubuc, Einhorn, Fournier, Paglieri, and Rudnitski. None of these, according to Sacconaghi, was demonstrated anatomically, the therapeutic results only serving as proof. The cases of Einhorn were reported in men of thirty-five, fifty and thirty-four years, respectively: the one as large as a goose egg under the left margin of the rib, which could readily be followed to the median line; another, as large as a hen's

egg, was palpable in the epigastrium; and the third, about the size of a goose egg, involved the anterior wall of the stomach. The physical findings in these cases, as well as the symptoms, were such as to justify a diagnosis of carcinoma, if a history of syphilis had not been elicited.

The writer desires to direct attention especially to the class of circumscribed, well-defined gummatous tumors by reporting 2 cases which present some points of great interest.

Case I.—L. W. M., plumber, æt. thirty-two, was reported by the writer some two years ago, and possibly represents a class of cases frequently encountered but not recognized. In the fall of 1907 the patient began complaining of gastric symptoms, prior to which he had been exceptionally free from such disturbances. The symptoms were characterized by belching and gnawing pains from half an hour to an hour after eating, and they were so severe that he was compelled to lie down for relief. There was no vomiting, no bloating, no black stools at this time; and he began losing weight and strength gradually. His appetite was good, but he was afraid to eat. He had been put to bed by another physician on a milk and egg diet, during which he lost 30 lb.

He had weighed 146 lb., stated that he had never been sick before, and denied outright any specific infection. The physical examination revealed at this time practically nothing of importance. The stomach was of normal size and position; no tumefaction; but there was a point of exquisite tenderness in the median line just below the xyphoid cartilage. Repeated examinations of the gastric contents revealed no retention, macroscopical or microscopical, a total absence of hydrochloric acid, no lactic acid, no Oppler-Boas bacilli, no sarcinæ, no branching yeast. Based upon these observations a diagnosis was entered of *chronic ulcer probably undergoing carcinomatous degeneration.* Exploration was urged, but was refused by the patient. One month later, the gastric contents revealed many long bacilli, digested leucocytes, but still no evidence of stagnation. Operation was now urged so strongly that the patient discontinued his visits for a period of two months. At the end of this time he returned, very weak, greatly reduced in weight, suffering intensely, and decidedly anemic. There was now a definitely palpable mass in the epigastrium, midway between the xyphoid and the umbilicus, irregular in outline, apparently the thickness of a thumb, and about 7 cm. in length, extending across the epigastrium obliquely. There was now marked stagnation, 8 to 10 oz. being removed after an Ewald test breakfast, total absence of hydrochloric acid, presence of lactic acid. The diagnosis seemed now perfectly evident, viz., carcinoma of the lesser curvature and pylorus.

He now consented to operation. The surgeon found an inoperable mass on the lesser curvature as large as a hen's egg, the greater portion being covered by the left lobe of the liver and adherent to the under surface of it. The mass obstructed the pylorus and was so adherent to everything about it that gastroenterostomy was rendered difficult. It was accomplished, however, by means of the Murphy button. A grave prognosis was given to the family with the diagnosis of cancer.

About this time it was accidently learned that the patient had been treated three years previously for syphilis of the nose and throat, although he had denied any knowledge of lues in the initial history. This was prior to the days of Wassermann reactions. As soon as the patient was able to take nourishment, antiluetic treatment was instituted, and for many months he took as much as 320 grains of iodides daily, with the result that the tumefaction disappeared completely, and when examined last in January, 1910, a year following his

operation, he was completely well, had recovered his former weight, experienced perfect digestion with no gastric retention, but there was still an absence of the hydrochloric acid. This latter is to be accounted for in all probability through an irreparable chronic atrophic gastritis with more or less complete destruction of the glandular elements.

CASE II.—C. S., *æt.* twenty-one, is a more striking and in many respects a more instructive case than the previous one. There was nothing of importance in his family history. He had had a gonorrheal discharge at fifteen years. There were no ulcer and no eruption. At seventeen years of age he had a sore throat which was treated as tonsillitis. It was very persistent, followed by ulceration of the tonsils and an enlargement of the glands in the neck. This continued for a year in spite of treatment. He does not know the character of treatment used. About this time the glands in the neck became more and more swollen until they were "as large as hickory nuts," the whole half of his face was edematous and swollen, and there appeared an eruption on his forehead which persisted for two months or more. He fell into the hands of one physician after another, and was finally operated for supposed tubercular lymphadenitis. Judging from the scars, a most extensive operation was done. There was improvement in the local condition for a time, and then the swollen glands in the neck, with an undermining of the tissues about the left ear, reappeared.

Soon after this he fell into the writer's hands on account of a stomach trouble which had then persisted for two and a half months. He attributed it to the eating of fish which was followed by abdominal cramps. He denies having had any gastric disturbance prior to this time. He was now vomiting almost daily, usually an hour or so after eating, but never observed blood either in the vomitus or stools. He complained of more or less pain in the epigastrium accompanied by belching, fullness, sensation of weight in the stomach. In two months he had lost 15 lb. and had been more or less constipated.

Examination.—Height 5 ft. 3 in. Weight 79½ lb. Has a small adolescent frame. Wide head. Closed fontanelles, an upturned, but not a saddle nose. No evidence of keratitis. Large, disfiguring, red scars extend from the left pinna, under the jaw, to the right pinna; also along the posterior border of the sternomastoid on the right side, from the mastoid to within an inch of the clavicle, and on the left side to within 2½ in. of the clavicle. A fresh irregular ulcerating surface with crusts extends upward about 1½ in. from the outer third of the right clavicle. Large perforation of the lobule of the left ear. The second right inferior molar, third superior, left inferior and superior are missing; also second superior left incisor, no fifth molars. The teeth are poor, and a gangrenous area is present on the gums of the three inferior incisors. Mouth and pharynx dry. Tongue glistening, dry, and partially covered with a yellowish, dirty coating. Small perforation of the soft palate where the right anterior pillar joins the palate; the posterior pillars on both sides are partially obliterated, being joined by a scar formation to the posterior pharyngeal wall. The soft palate is red, but not evenly so, presenting a splotched appearance. Chest flat, bony landmarks prominent. There is a diminished resonance in both infraclavicular regions with harsh breathing in the first and second interspaces and prolonged expiration on the left side. Dullness extends to the scapular spine posteriorly, and over this area there is harsh breathing and prolonged expiration. Harsh breathing at the angle of the left scapula. Heart sounds are normal. Axillary, epitroclear and inguinal glands are enlarged. Spleen not enlarged.

A tumor is visible and palpable in the epigastrium, has an irregular contour, is apparently about the size of half an orange, moves but slightly upon respiration, gives a distant tympanitic note on percussion, as if lying over a hollow

viscus; pulsations in the tumor are both visible and palpable, not 'expansile, but as if the tumor rested on a large vessel. Deep palpation causes pain. The liver dullness extends from the lower border of the sixth rib to one and a half fingerbreadths below the free margin of the ribs. Muscular rigidity is increased over the entire epigastrium. The inflated stomach extends a fingerbreadth below the umbilicus; the lesser curvature cannot be made out. Marked succussion over the antrum pylori. The abdomen is not distended in the lower half and is otherwise negative. Von Pirquet test positive after twenty-four hours, and decidedly so after forty-eight hours. Wassermann reaction decidedly positive. The blood flows slowly, is rather thick. Hemoglobin 85 per cent., leucocytes 11,200, erythrocytes 6,456,000, polynuclears 84 per cent., lymphocytes 10 per cent., large mononuclears 3½ per cent., eosinophiles 2½ per cent. It is worthy of note that this blood-picture is not such as is usually met with in malignant tumors. The sputum was negative. The urine contained a definite, narrow ring of albumin, microscopically a few leucocytes. The stomach-contents at this time showed, macroscopically and microscopically, stagnation after an Ewald test breakfast, containing muscle fibre, vegetable cells, fatty acid crystals, etc., from previous meals. It was fairly well chymefied, with a marked increase in mucus, a free hydrochloric acidity of 24, total acidity 34, peptogenic power 51. Occult blood, negative.

The patient entered the hospital on April 20th, emaciated, weak, weighing 77½ lb. There was now an additional small mass palpable just above the umbilicus, slightly to the right of the median line, about the size of a hickory nut, and apparently separate and distinct from the original tumor, which lay just above and to the left of it at the costal margin. This tumor was likewise hard and irregular in outline, not movable with respiration, but slightly so upon manipulation.

Deep intramuscular injections of succinimide of mercury were instituted, and the patient's physical condition began to improve forthwith. On May 10th his weight had increased to 85 lb.; and the small tumor had become almost imperceptible, the larger one rapidly disappearing. The mercury was given at first every three days, then every other day. The gastric retention became much less pronounced, while the subacidity persisted. An Ewald test breakfast given on May 15th, and removed in an hour and a half, showed free acidity 14, total acidity 20, occult blood positive, peptogenic power 57 per cent.; whereas on June 19th, 2 oz. were removed after an Ewald test breakfast, which were well chymefied, free acidity 31, total acidity 32, peptogenic power 70 per cent. There was still slight evidence, microscopically, of retention. Occult blood positive. By this time the tumors had entirely disappeared. The patient weighed 100 lb., and was receiving iodides in doses of 30 gr. three times a day. Strange to say, this patient was unable to take larger doses of iodides, though he was able to continue this dose for indefinite periods. If an attempt was made to increase the dose, his face became very much flushed and edematous. He has been receiving mercury and iodides off and on since he left the hospital. The Noguchi reaction has been made from time to time and is still positive. Frequent analyses of the gastric contents have been made, and show how the gastric mucosa has gradually returned to the normal condition: the hydrochloric acid content, the peptogenic power, and the motility now being perfectly normal. Free hydrochloric acid is 46, the total acidity 57, no microscopical evidence of retention, and occult blood is negative. The patient weighs 120 lb., and to all appearance is in a perfect state of health.

Valuable lessons may be drawn from both these cases. Had lues been suspected in the first patient, when he first consulted the writer, and

antiluetic treatment instituted, a surgical operation would have been unnecessary. But when he returned to the writer, however, with a large mass in the epigastric region, and such a logical sequence of symptoms of carcinoma with fairly complete obstruction of the pylorus, it is doubtful if any procedure other than gastro-enterostomy would have been justifiable. Even though lues had been suspected, the results of antiluetic treatment would probably have not been manifested quickly enough to prevent the starvation of the patient, and, on the other hand, if it were carcinoma, temporizing would have been unjustifiable.

Conclusions.

A careful history should be taken in every case of chronic gastritis, ulcer of the stomach, and tumors of the stomach, with special reference to the possibility of lues. If a definite luetic history is obtained, and especially in the presence of a positive Wassermann or Noguchi reaction, antiluetic treatment may well be instituted. If the chronic gastritis or ulcer is not of luetic origin, the patient would be very apt to rebel against iodides; for, as stated previously, even the normal stomach does not tolerate iodides well, much less a diseased organ, unless the disease be directly or indirectly due to syphilis. If, therefore, a patient tolerates iodides well under such circumstances, they should be pushed to the limit. In cases of doubtful tumors of the stomach not obstructing the pylorus or cardia, whether or not a luetic history or a positive Wassermann reaction is obtained, it would be well to institute antiluetic treatment for a short time, at least. If, on the other hand, the growths are already obstructing the pylorus, even though a positive history and a positive Wassermann have been obtained, a gastro-enterostomy should be done to avoid the dangers of temporizing, and antiluetic treatment should be instituted afterwards, as was done in the writer's first case.

Linmar Building.

GUMMA OF THE PROSTATE, WITH REPORT OF A CASE.

By Abner H. Cook, M. D., of Hot Springs, Ark.

The following case presented itself at the writer's clinic on May 4th, 1912:—

R. P., male, Englishman, sailor, *æt.* thirty-eight, single.

Family History.—Negative; nothing positively known.

Past History.—Went to sea at fourteen years of age. Smallpox in 1895. Malaria on several occasions.

Venereal History.—Gonorrhea about fifteen years ago, several subsequent attacks, last in 1910, which was completely cured. Sore on penis "about nine years ago" which was diagnosed chancroid; several weeks later rash appeared, throat became sore, hair fell out and syphilis was diagnosed. Treatment *per orum* instituted and continued three or four months, in which time all symptoms disappeared. Patient in good health until spring of 1908 when ulcer appeared upon left tibia; this healed after several months of internal treatment. Other sores appeared from time to time. In December 1911 the tibiæ began to ache, especially at night; later noticed enlargement which gradually grew and finally broke down and began to discharge.

Present Illness.—Frequent and difficult urination began in January, 1912; sensation of fullness in perineum, which becomes painful upon defecation when constipated; deep pain in perineum after coitus, this has grown worse until now priapism is very painful; discharge appeared the latter part of April. Has lost 20 lb. in weight during the last five months.

Examination.—Height 64 in., weight 135 lb., pulse 71, respiration 16, temperature 97.4° F., blood-pressure: diastolic 104 mm., systolic 135 mm. Skin sallow, muscles flabby, mucosæ pale, general glandular enlargement. Patellar and pupillary reflexes diminished. Pigmented scars over both tibiæ, necrotic subperiosteal gumma of left tibia. Arteries sclerosed. Heart and lungs: second pulmonic heart-sound accentuated, lungs negative. Abdomen: liver, upper border at fifth interspace, lower border 2 cm. below costal margin in midclavicular line. Spleen slightly enlarged. Genito-urinary system: a slight, thin, sticky, brownish discharge; stricture in anterior urethra; prostate so large that size could not be determined and of the consistency of a hard rubber ball, pressure causing pain and increasing the discharge; rectal wall movable and no indication of fixation. Urine: Wolbarst five-glass-catheter test; first, fourth and fifth glasses contain shreds and are cloudy, for remaining glasses chemical and physical examination negative; microscopic examination: bacteria, pus, epithelial cells and red blood-corpuscles present. Urethral discharge: red blood-corpuscles numerous, pus cells, epithelium, corpora amylacea present. Gonococci negative.

Diagnosis.—Syphilis and malignancy of the prostate.

Treatment and Progress.—May 5th, mercurial inunctions and potassium iodide instituted. May 12th, urethral discharge diminished. Dosage of mercury and potassium iodide increased. May 19th, discharge ceased, prostate smaller, softer, and painless. Other lesions and symptoms much improved. May 26th, prostate still decreasing, patient much improved. June 5th, all medication discontinued

and salvarsan administered intravenously. June 10th, mercury and potassium iodide reinstated. June 16th, prostate almost normal in size, leg lesion well, and patient feels as though he were well. June 23rd, prostate normal in size, patient fells perfectly well. Treatment temporarily discontinued, and patient requested to report back for further treatment and observation, which he has not done.

Final Diagnosis.—Syphilis with gummata of left tibia and prostate.

It will be noted that carcinoma of the prostate was first diagnosed and surgical interference advised; that the case was not turned over to the surgeon was due to the fact that the patient refused to consider surgical interference. Antisyphilitic treatment was instituted on account of the other lesions and symptoms of syphilitic infection. The rapid amelioration of prostatic and urinary symptoms, as well as the recognized symptoms of syphilis, caused the diagnosis of prostatic gumma.

With the assistance of Dr. Chas. A. Pfender, of Washington, D. C., the writer has been able to find recorded but 5 cases of prostatic gumma. These were reported by Reliquet, Wroczynski, Rochon, Drobiny, Grosglik and Krajewski.

The fact that malignancy was diagnosed first in the writer's case and in 2 of the others reported—50 per cent. of all reported cases—raises the question of differential diagnosis between gumma and malignancy of the prostate. A tabulation of signs and symptoms presented by the reported cases reveals but little difference between the two conditions. Age seems to be of importance; the youngest case was that of Reliquet's, twenty-eight years of age; Wroczynski's and Drobiny's were both thirty-two, the writer's case thirty-eight, Grosglik and Krajewski's case was forty-three, and that of Rochon sixty; one case under thirty, three from thirty to forty, one from forty to fifty and one over fifty.

Carcinoma of the prostate is rare under fifty, and sarcoma itself, a rare condition of the prostate, is more common under twenty; gumma of the prostate fills the interval between these two malignant conditions.

The history of syphilitic infection or a positive Wassermann reaction is almost essential for a diagnosis of prostatic gumma. The cases reported gave histories of syphilitic infection from nine to fourteen years prior to the appearance of the gumma, except Reliquet's case who denied syphilitic infection.

All cases gave some evidence of a discharge; however, the discharge in Grosglik and Krajewski's case and Reliquet's may be attributed to gonorrhea. Drobiny's case presented only pus on massage, and in 2 cases the discharge contained blood. A discharge in malignancy of the prostate has been entirely wanting in the writer's experience, and he cannot find it enumerated among the symptoms in the standard texts.

The remaining symptoms are so closely allied with those of malignancy, or any other disease causing prostatic enlargement and its sequence, that their discussion would be useless.

The writer's conclusions are that a person presenting with an enlarged prostate, under fifty years of age, and giving a history of syphilis several years previous or giving a positive Wassermann reaction, in view of the prompt response to treatment, should be put on specific treatment, preferably given an intravenous injection of salvarsan, before surgical measures are resorted to; this is especially true if there is a discharge containing red blood-corpuscles and no gonococci.

Grosglik and Krajewski's case is of special interest because of return of the gumma twice in a few months after a so-called cure. Wroczynski's case had, apparently, a concomitant syphilitic affection of the rectum.

REFERENCES.

1 Wroczynski (*Medyzyma*, No. 41, 1894).

2 Oeuvres complètes du Dr. E. Reliquet. Vol. 3, p, 87. Paris: A. Guepin. 1895.

3 Rochon: Syphilis de la Prostate. (*Ann. d. Mal. d. Org. Genito-Urin.*, Paris, Vol. 15, pp. 658-660.)

4 Grosglik: Gumma der Prostate. (*Wien. med. Presse*, Vol. 38, pp. 73-75, 102-105, 1897.)

5 Drobiny (*Med. Obozr. Mosk.*, Vol. 65, pp. 455-457, 1906).

6 Kudintseff (*Pract. Varch. S. Peterb.*, Vol. 7, pp. 855-857, 1908).

MEDICAL AND SURGICAL PROGRESS.

RECENT ADVANCES IN CANCER RESEARCH.

A REVIEW OF RECENT LITERATURE.

By Moyer S. Fleisher, M. D., of St. Louis.

1. Neuberg, Caspari and Lœhe (*Berl. klin. Wochenschr.*, July 22nd, 1912).
2. Coca (*Zeitschr. fuer Immunitætsforschung*, Vol. 13, p. 524, 1912).
3. Coca, Dorrance and Lebredo (*Zeitschr. fuer Immunitætsforschung*, Vol. 13, p. 541, 1912).

Since the appearance, early this year, of a preliminary article by Neuberg and Caspari in which was announced that, following Wassermann's method of intravenously injecting colloidal metals, they had been able to influence and even cure tumors in mice, these investigators have extended their experiments and have now reported their results in full.

Neuberg gives in detail the preliminary considerations which led to their plan of work. It is a well-known fact that tumors grow rapidly and degenerate even more rapidly. This degeneration is in part due to self-digestion—namely, autolysis. It has been shown that tumors contain active proteolytic ferments which probably differ from the similar ferments contained in the cells of normal tissues. Furthermore, it has been shown that certain of the heavy metals stimulate the action of many autolytic ferments. With these two known facts as a basis, an attempt was made to inject substances—salts of the heavy metals—which would stimulate the autolytic action of the tumor cells.

Before the appearance of Wassermann's article, in which the influence of the *intravenous* injection of a colloidal compound of selenium was described, Neuberg and Caspari had attempted only to influence the tumor by subcutaneous injection, and had, by this method, been able to slacken the rate of growth of the tumor and to extend the inoculated animal's term of life. They had not, however, been able to destroy the tumors in any cases.

It was only after the suggestion had been made to give the substance intravenously, that they began using this method, and their results were very much more definite. After a single injection they were able to note a softening of the tumor; and small quantities of fluid could be withdrawn from the centre of the tumor from eight to twenty-four hours after the injection. This fluid had the character of autolyzed material, showing a marked breaking-down of albuminous substances. In a large number of instances they claim to have cured the tumors.

Although in their preliminary article Neuberg and Caspari stated that they were able to obtain good results by the injection of quantities of the substance which were well under the lethal doses, they now advance the idea that the lethal and the curative or efficient doses are very nearly the same; hence, it is apparent that they were not successful in curing the tumors with doses markedly less than lethal.

It appears, then, that they have overcome the difficulty caused by the substances being precipitated by the albumins of the blood; and their belief is that all or nearly all of the injected substance is deposited in the tumor. As an evidence of this they describe the appearance of the mice immediately after injection: the nose, paws, and all exposed parts not covered by hair, became very pale and remained so for some time. If such an animal is killed it will be found that all the vessels round the tumor are engorged and greatly dilated. A large number of substances have been used; compounds of copper, lead, platinum, and especially cobalt and silver bave given good results. In addition, arsenic, antimony, vanadium, mercury, gold, iridium, ruthenium, osmium, palladium and rhodium have been used. Relatively small quantities seem to suffice to destroy the tumors; the injections each day of as little as one part of silver to six hundred thousand parts of body-weight of the mouse is sufficient to cure the tumor: thus a mouse weighing 15 grm. will receive each day about 0.25 mgrm. of silver. A mouse weighing 15 grm. may be cured when about 0.3 mgrm. of copper is injected each day.

Neuberg, Caspari and Lœhe experienced the same difficulty which had previously been encountered by Wassermann and his co-workers: in some cases the mice, in which the tumor apparently was being destroyed, as a result of the injections could no longer be used for intravenous injections after some time—the veins of the tail being destroyed and obliterated. It was necessary in a number of cases to stop the injections when apparently good progress had been made, with the result that the tumors began to grow after the injections were stopped. Furthermore, in other cases the mice died, supposedly as a result of the absorption of the autolytic products of the tumor.

The substances which these investigators used were tested on mice, rats and dogs. The most extensive work, however, was done with mice. Several different kinds of inoculated tumors were used, and all were treated with equal success. In addition, spontaneous tumors in mice were also cured with these substances. In all instances, the mouse tumors were carcinomata. The work with rats has not as yet been very extensive; apparently, the early softening of the tumor noted after the first or second injection into mice, may also be noted in rat tumors (sarcoma); in a few cases the tumors were destroyed. Only a few experiments were carried out with dogs, and although a distinct softening of the tumor was noted, so far no definite cures have been effected.

There are certain points in their paper which are not very clear; in no part are we told how many animals were treated nor in what percentage of treated animals definite cures were effected. We are told that many injections are necessary in order definitely to cure, but do not learn how many injections will usually suffice to destroy the tumors. Although it is evident that the substances used exert a marked and beneficial action on tumors of mice, rats and dogs, it is nowhere evident in exactly what degree we can consider these substances as curative.

A less startling and less promising type of treatment has also received consideration lately, both in a theoretical and experimental manner.

Coca, who with Gilman, used the so-called method of "vaccination"—previously employed by Leyden and other investigators—has now reported the results of some further experiments. In the treatment of cancer by vaccination the vaccine is prepared by grinding cellular portions of a human tumor in the vaccine lymph machine; by this grinding most of the cells are broken or destroyed. Varying quantities of this "vaccine" are injected subcutaneously into the cancer patient.

Coca has considered all those experiments which offer some basis for the belief that the treatment of cancer patients by cancer vaccines may be of value. He reviews first the evidences of the production of specific cytolysis by the injection of various cells. He dwells especially upon the production of antibodies which will destroy spermatozoa, and upon the experiments which seem to demonstrate that the spermotoxins occupy a special position in that they can be produced in an animal by injection of spermatozoa from the same animal, and that the antibodies produced are not specific in the same manner and degree as are those produced by the injection of cells of other organs. It would seem that spermatozoa act as foreign body-cells, since a certain degree of anaphylaxis may be produced as a result of this injection. He believes a certain analogy may exist between spermatozoa and tumor cells; and, furthermore, calls attention to the fact that the injection into animals of their own body-cells will lead to the formation of antibodies. This certainly must be proved before it would appear reasonable to hope to influence a tumor by the injection of a vaccine prepared from the excised portions of the same tumor. (In many cases autogenous tumor vaccines are used.)

Coca first takes up the consideration of the various theories of immunity in cancer. He does not accept the athreptic theory, according to which the tumor will not grow in an animal either because of an absolute or relative lack of certain specific food-stuffs. In fact, the theory of athreptic immunity is, as a rule, not applied to the type of immunity which is here being considered. The only experimental type of immunity which he actually takes into consideration is the type existing in a normal animal, which guards it against the growth of an implanted tumor; while athreptic immunity is noted, according to Ehrlich, only in an animal in which a rapidly and actively growing tumor already exists.

Two theories have been advanced to explain the resistance to inoculation with a tumor, which is noted in an animal previously treated with tumor material and in which no tumor is growing. According to the first of these, cytotoxins are produced; which act specifically on tumor cells so that when such cells are introduced in the body of an immunized animal these antibodies act upon and destroy the cells. Coca does not believe this theory to be correct, since it has been impossible to prove the existence of any substance which, when mixed with extracts from cancer cells, will produce a precipitate—thus apparently precipitins are absent; and, furthermore, it has not been possible to demonstrate the presence of any antibody by means of the complement fixation test. In addition, when guinea-pigs are injected with cells of a rat sarcoma, it has been found that rat-sarcoma cells grew either not at all or only very poorly *in vitro* in the plasma of such animals, and it was apparent that antibodies were produced which prevented the growth of these cells; on the other hand, when cells of a rat tumor were grown *in vitro* in the plasma of an immunized rat, they grew well; thus it became evident that no antibodies were present or at least no antibodies were demonstrable in the plasma of the immunized rat. In view of these evidences of the absence

of any form or type of antibodies in the blood of immune animals, he does not accept this theory regarding immunity to cancer inoculation. But he does believe that immunity to cancer can be explained as being due to a local anaphylactic (allergic) action, a theory which was first advanced by von Dungern. As a basis for this belief he quotes some experiments carried out by R. Weil, in which immunity was produced by previous injection of filtered cell-free tumor material. Furthermore, when a tumor was inoculated into immunized animals a more marked reaction took place than in normal animals; thus an evidence of local anaphylaxis was present. In these same experiments of Weil's it was noted that the injection of the tumor filtrate prevented the growth of the inoculated tumor if given either some days before or immediately before the inoculation.

Coca offers very little definite evidence, obtained through experimentation in cancer immunity, as to whether the use of cancer vaccines is of benefit in human cancer. In his second paper, in conjunction with Dorrance and Lebredo, the results of the injections of vaccines are given. In 70 cases treated, none was cured and only 5 were distinctly benefited as far as the tumor was concerned. Gilman and Coca, who treated some cases while in the Philippines, claim to have cured one case, the tumor entirely disappearing; but not sufficient time has elapsed to exclude the possibility of a recurrence. However, as already stated, in this later series no case was actually cured. Many of the cases were benefited, the cachectic conditions being diminished. Coca believes the cachexia to be due to a slow anaphylaxis, a small amount of injurious foreign substance being given off from the cancer constantly; but when the vaccine is injected a state of anti-anaphylaxis is set up, the cachexia being done away with in this manner.

It is of interest to note that only once, in Coca, Dorrance and Lebredo's series of cases, was there a reimplantation of the tumor as a result of the infection of the vaccine; but this was due to the use of a faulty lymph machine in the grinding process.

The results of these experiments do not point to any possibility of "vaccination" being used successfully in the treatment of cancer.

POLIOMYELITIS.

By NATHANIEL ALLISON, M. D., of the Editorial Staff.

1. Flexner and Clark: Experimental Poliomyelitis in Monkeys. (*Journ. Amer. Med. Assoc.,* July 27th, 1912.)
2. McIlhenny: Hyperemic Treatment of Acute Anterior Poliomyelitis. A Preliminary Report. (*Boston Med. and Surg. Journ.,* July 18th, 1912.)
3. Grunewald: Concerning the Special Susceptibility of the Extensor Muscles, and Concerning the Atrophy of Inactivity. (*Zeitschr. fuer Orth. Chir.,* Bd. XXX, Hft. 1-2.)
4. Flexner: Experimental Poliomyelitis. (Internat. Clinics, Vol. I, 22nd Series.)
5. Sophian: An Analytical Study of Twenty Cases of Infantile Paralysis. (*Archives of Pediatrics,* March, 1912.)

Flexner and Clark have shown by experiment that the intestinal discharges are a source of infection in cases of poliomyelitis. The virus of the disease has been found in the intestines, being swallowed and not destroyed by the stomach juices. The nasopharynx seems to be the site of entrance of the poliomyelitic virus, and the virus remains active in the nasopharynx for a considerable period of time.

Flexner has also published an interesting résumé of his work on experimental poliomyelitis. He gives credit to Landsteiner and Popper, of Vienna, for the first successful transfer of human poliomyelitis to the monkey. Since then many successive transfers have been made in a large series of monkeys, and the most successful results have followed intracerebral inoculation, though constant results follow intranasal inoculation, and less uniform results intraneural inoculation. Monkeys are less readily affected by the human virus than they are by modified monkey strains secured by successive inoculation. The distribution of the virus in the monkey is similar to that in the human. The central nervous system is principally affected; less frequently the tonsils and nasopharyngeal mucosa, the mesenteric lymph-glands, and other lymph-nodes. It is not found in the large internal organs. It has not yet been possible to isolate or cultivate, artificially, an infectious agent. It passes through earthen filters, and is therefore ultramicroscopic. It is highly infective and virulent and can survive in external nature, but does not multiply there. It persists in the central nervous system and in the mucosa of the nasopharynx for months, making it possible for infected animals and humans to become chronic carriers of the disease. In monkeys the clinical course of the disease is analogous to that in human beings, the same types being manifest; that is, the abortive type, the meningeal type, the cerebral type,

but, most frequently, the spinal type. The mortality of monkeys is very high. Though the pathogenesis of the disease is not as yet well appreciated, it seems to be inflammatory, primarily affecting the interstitial tissues of the spinal cord and other parts of the central nervous system. There is an outpouring of lymph and white corpuscles, which impedes by pressure the circulation, and this produces functional and structural changes in the nerve cells. It appears also that the transmission of the infective agent is through the lymph-channels, and not through the blood. The disease is transmitted during epidemics in a way not yet determined; that is, either by human agency or by animals or insects. The common house-fly is capable of harboring on its body the virus in a living and infectious state for at least forty-eight hours, and the viscera may contain the virus for some time. An attack of the disease produces immunity from further attacks. The sera contain a feeble immunity. This has been obtained in the blood of horses and other animals, but its action is so feeble that it offers little hope as a means of prevention of the disease in man. The use of such drugs as hexamethylenamin, which is eliminated into the subdural space, produces valuable results in the treatment of the disease. Cases of poliomyelitis should be isolated; and, in view of the infectious character of the mucus secreted from the nasopharynx, the nasopharyngeal space should be treated antiseptically.

McIlhenny has reported 5 cases of poliomyelitis seen shortly after the onset, which he has treated by spinal cupping. This he thinks diminishes the muscular soreness and aids in the recovery of muscular movement.

Sophian has analyzed carefully 20 cases of acute poliomyelitis in the epidemic of 1911. He noted the following forms: Myelitis, 3 cases; Landry's paralysis, 1 case; abortive cases, 4; and polioencephalitic, cerebral form, 12 cases. He says there is often overlapping of the different types in the same case. He differentiates easily poliomyelitis from cerebrospinal and tuberculous meningitis before the appearance of paralysis. There are lacking the severe symptoms of meningeal irritation and cerebral disturbance in tuberculous meningitis; and, furthermore, after the palsies appear in poliomyelitis the temperature drops and the constitutional symptoms are lessened. This does not occur in either of the other diseases. In the polioencephalitic type the diagnosis is more difficult. The sudden onset, however, differentiates it from tuberculous meningitis, with its obscure beginning and insidious course. In cerebrospinal meningitis there is greater irritability, restlessness, hyperesthesia, and the sensorium is disturbed. Examination of the cerebrospinal fluid is of great value in diagnosis. In poliomyelitis there is a negative globulin reaction, slight, or no increase in gross fibrin content, and only a moderate increase in the total number of cells, with a high lymphocytosis. In tuberculous meningitis there is a strong globulin reaction, considerable increase in fibrin and cells, with a high lymphocyte count. In cerebrospinal meningitis the fluid is cloudy with a sediment of pus, a strong globulin reaction, a large increase in cells, and a polynuclear count up to 100 per cent.

Grunewald has called attention to the fact that the extensor muscles are more commonly diseased than are the flexor. He explains this on a broad biological basis, the evolution of the human body producing tissues and organs that have been developed, or specialized later than have other tissues; and these are more susceptible to injury and less resistant to disease than are the older tissues. Comparing the muscles of man with those of the ape, it is found that the human extensor muscles are much stronger in comparison with the corresponding flexor than are the extensor

muscles in the ape. When man assumed the upright position, the quadriceps and the gluteus developed necessarily greater power, and when he began to use his upper extremity as an instrument of labor rather than as an arm, the deltoid acquired increased strength and function. These three muscles, consequently, are tremendously overdeveloped, and as they are phylogenetically younger tissues than the flexor, they are more susceptible to injury and atrophy when the joints they move are injured or diseased.

SPECIAL ARTICLE.

"DAS BUCH DER BUENDTH-ERZTNEI" OF HEINRICH VON PFOLSPRUNDT, MEMBER OF THE GERMAN ORDER.*

By Frank J. Lutz, M. D., of St. Louis.

In comparison with the Italian and French, the German Universities of the Middle Ages contributed little to medicine, and less to the progress of surgery. A separate class of practitioners concerned themselves exclusively with surgery, and they did not enjoy the meagre instruction which was available for the physician at the Universities.

The medical faculties of the German Universities never consisted, during the fifteenth century, of more than two teachers, whose salaries were so small as to compel them to add to their income by practising; and since the number of graduated physicians was relatively small and their "calls" often meant prolonged journeys, the teachers were frequently absent from their posts.

When the University of Prague was founded in 1348, fifteen Italian cities boasted of High Schools, and outside Italy, fifteen cities had universities and in five others attempts to found them had been made. The courses were very deficient; books and theories were read and explained, but the teaching of anatomy was begun only toward the end of the fifteenth century.

Hippocrates, especially his aphorisms, Galen, Avicenna, Rhazes and the "Ysagoge" of Johannitus were discussed and explained.

It is not in keeping with historic truth, however, to assert that during the Middle Ages general culture was of a low degree, even in countries situated at great distance from the centres of learning. Acquaintance with the medicine of the ancients was fairly general, not so much because the authors were read in the original—that came only with the revival of Greek—but through numerous compilations and extracts from the best works. Even before the tenth century the more important works of Hippocrates and of Galen were translated into Latin, and in the following century the work of Constantinus Africanus, at Salerno, by placing into readable form the Arabic compilations, brought the medical knowledge of the Orient within easy reach. And it was not very long before works were composed in the vernacular of the various countries.

In Greece and Alexandria medicine and surgery were one, and could not be sundered. As the result of clerical, feudal and humanistic conceits they were separated, and surgery entered upon a development radically different from that which was natural. The clergy were the guardians and preservers of the ancient learning, including medicine. Many learned physicians were members of the priesthood, and these priest-physicians

furnished the largest number of the professors at the Universities; but the practice of medicine was mostly in the hands of the laity, and among them very many were Jews. These lay physicians received their education in schools which were founded to teach that which the Universities neglected to do—namely, surgery. From these schools came such men as Roger Roland and Lanfranchi. How the latter first established a practical bedside surgical course, which drew many students to the Collège de St. Come in Paris, is well known. The works of these and others of their kind, such as Guy de Chauliac, are based upon Greek tradition, partly upon Arabic medicine, but mostly upon their own experience.

The surgeons were craftsmen and received no learned degrees, either in Germany or in other countries. In Germany the treatment of all external diseases was in the hands of the surgeons or *wundærzte*—barber surgeons. They were united in a guild. Those belonging to the guild learned their art from a master and were accepted as apprentices on condition that they were of German parentage, and were considered worthy by the Freemen of the city. Admission as a pupil was connected with prescribed ceremonies and was held before the assembled council of the burghers and in the presence of the Master. After the apprentice had served his time and had shown himself "learned in the art" and accomplished, he was made a journeyman. To become a Master he must present his indenture and be examined in order to demonstrate whether he be competent to be a Master; and in proof of his skill he was obliged to make his masterpiece. The latter consisted, according to the regulations for the barber surgeon of Hamburg from 1468 to 1519, in showing how to reduce disjointed members properly.

To this class of practitioners belonged Heinrich von Pfolsprundt, who lived about the middle of the fifteenth century. His work entitled "Buch der Buendth-Erztnei"—which means directions for bandaging—attracts our attention, not only because it was the first surgical treatise written in German, but on account of its contents. Had this volume, which was composed in 1460, thus antedating that of Hieronymus Brunschwig by thirty-seven years, become known when it was written, history would have accorded Pfolsprundt the honor of being the first author to describe the Italian operation of rhinoplasty to which the name of Tagliacozzi has been attached ever since the latter furnished a description of it one hundred and twenty-six years after this German work was written.

Pfolsprundt also can lay claim to priority for being the first to mention wounds inflicted by shot guns. His treatise on arrow wounds is especially complete and lucid.

Concerning his personality we have little definite knowledge. He appears to have sprung from a noble family which resided in the little town of Pfolzpaint, still in existence near Eichstædt in Middle Franconia, Bavaria. He was a member of the German Order, and in many wars of the Order against Poland, and especially during the siege of Marienburg in 1457, he seems to have acquired considerable experience.

He obtained his first surgical knowledge in the barber shop, and subsequently increased it on his many wanderings in German and Welsh (Italian) lands, where he enjoyed the instruction of competent Masters. Among them were John of Birer, Christopher of Muenster and Munich, Hans of Baireuth, Conrad of Nuremburg, Linhard of Basle, Hans of Halberstadt, Otto von Heideck at Weisenburg. The most distinguished among these was John of Birer who lived in Lorraine, near Metz. He

was far famed as a practitioner and the author of a surgical work "The Art."

Besides the surgeons who had enjoyed the advantages of the schools of surgery, there existed a third class of surgeons—barber surgeons. It would not be in keeping with the facts to say that a distinct line of demarcation was drawn in the practice of surgery between the graduated physicians of the Universities and the surgeons who had attended surgical schools; nor was there a clean-cut separation between the surgeons and the barber surgeons. It is true that originally the barber surgeons confined their activities to minor surgery—venesection, a most frequent procedure—cupping, leeching, etc. But no doubt as opportunity presented itself, they ventured to assist those whose condition did not demand an operation in the accepted sense of the term, and extended their sphere of activity to the treatment of wounds, dislocations, fractures, ulcers, syphilis and cutaneous eruptions. They were *wundærzte* as distinguished from *schneideærzte*—cutting doctors—who alone were privileged to perform bloody operations. This distinction is traceable to the time when Archagathos lived in Rome about 219 B. C. Pliny relates in his "Naturalis Historia" that he was the first Greek physician to come to Rome. He was well received; the Senate conferred upon him Roman citizenship, and he was given at the State's expense a shop. He brought to the attention of the Romans the works of Hippocrates, Herophilus, and Erasistratus, and acquired the title of *vulnerarius;* but his great predilection for cutting and burning discredited surgery greatly with the Romans and brought him the nickname *carnifex*.

Some of these barber surgeons were educated men; the largest majority of them, however, had neither the inclination nor the opportunity to indulge in literary pursuits. They were empirics, and their knowledge was handed from Master to pupil by tradition.

Pfolsprundt wrote his book for this class of practitioners. Its title page defines its limits. It is intended for *wundærzte*—a treatise on bandaging, using this term in its widest sense, and confines itself to injuries and wounds. He does not rise above the level of the illiterate readers for whom he writes—being himself illiterate—for not only is he ignorant of the old languages, but as philologists claim, "he is unfamiliar with his mother-tongue." He was an uneducated man, and hence did not know of authors who had written upon the subjects of which he treats, for he does not quote a single one. Nor had he any knowledge of anatomy, even not of those parts upon which he practised almost daily— fractures and dislocations. But within his proper sphere he moves with the safety of a sensible, experienced man who is fond of his calling; and, far from being a routinist, takes frequent occasion to remind his readers how necessary it is to use "common sense." And he sets high moral standards for the barber surgeon and demands a technique almost modern. He insists, in the introductory part of his book, that before the surgeon attends a patient he should first hear mass, unless the case is too urgent, when he should say five paternosters and five Ave Marias and the credo, in order that God may give him strength and understanding to cure the person in hand. He warns especially against drunkenness which leads to neglect of the patient, and the surgeon guilty of this will be punished by God. Nor should the surgeon eat onions, nor indulge in unclean cohabitation before attending a patient because of the danger to the wound from his contaminated breath. His bandages should be of clean white cloths; for, if they are not clean, injury results. He should wash his

hands before attending a wound. If the surgeon is not equal to the case he should willingly refer it to more experienced Masters.

When we consider the times in which he lived and the position of the barber surgeon in the fifteenth century, it is not surprising to find that he is not above charlatanism, mysticism and superstition. These attributes are markedly in evidence in his description of rhinoplasty and the removal of foreign bodies from wounds. Inviolable secrecy is imposed both upon the patient and the necessary assistants, and the room in which the former remains must be locked and no one allowed to enter lest he learn "the art."

When extracting foreign bodies, the miraculous instruments—simple hooks and gimlets—are carefully concealed from the patient and those around him.

To give the ointment, which he advises in cases of hernia, the appearance of "masterliness," he directs that it be colored red. The *Sanicula Europia*—the roots and herbs of which were formerly famous as vulneraries and promotors of the absorption of extravasated blood—he used as a fomentation, and in order that it be not recognized "it should be cut up very fine."

In writing this treatise Pfolsprundt evidently intended it for such lay readers as wished to familiarize themselves with the art of treating injuries, although many passages in it suggest that he had in mind that it might be useful also to *wundærzte*. He had imparted his knowledge to only two brothers of the German Order before he gave publicity to it in this book.

The manuscript copy of Pfolsprundt, from which the volume before you was printed, was found in 1858 among the effects of a physician of Silesia, and probably belonged to the library of the University of Erfurt. Since this publication in 1868 by Hæser and Middeldorpf, the former has found another copy in the Royal Library at Dresden, which differs in many essentials from the manuscript first discovered.

As one might expect, the contents, although the manuscript closes with a register, are far from being orderly arranged. The illustrations are few and crude, but they are among the first of which we have knowledge.

In the treatment of wounds, which should be brought to heal by suppuration, he employs oil of turpentine, oil of roses, plaster, etc. The suture is rarely resorted to, but he gives a very accurate and lucid description of how the interrupted suture is made: Thread a thin, long needle with green silk. The needle should pass through the skin and deep through the flesh, and the two sides should be drawn over a quill or a silver tube and the thread tied with a knot. If the bite of the suture does not embrace enough of the deeper tissue, it will tear out and only the skin will be united. Sutures should be removed after seven days, unless their removal will result in great damage. It is doubtful whether the *wilde Fewer* of which he speaks as occurring in wounds is inflammation or erysipelas.

Infected wounds require applications which will make them dry and cauterize them. Many substances are used for these purposes: alum, sulphate of copper, verdigris, arsenic, dragon's blood, vinegar, whiskey, garlic, onions, etc. He recommends protecting the healthy parts by a fenestrated plaster whilst the caustics are applied. In the absence of clocks and watches, the caustics were allowed to remain as long as is required to say three paternosters.

His favorite hemostatic method is a tampon saturated with styptics

which he holds in place by means of a chip, or if the wound is a narrow one, compression is made by means of a nutshell cut in half. He makes no reference to the ligature, and the multiplicity of his styptics would suggest that they failed him very often, as would be expected when he employed hogs' and asses' dung. On the other hand, he used cold in connection with his styptics and insisted that epistaxis was always cured by packing.

In the thirteenth century the Four Masters had recommended that in transverse wounds of the intestines—especially the large one—the trachea of an animal should be put into the intestinal lumen, having first drawn the intestine out by means of a thread. The intestine is then sewed together over the trachea and brought to the wound in the abdominal wall. The commentary on Roger's "Surgery" and its elaboration by Roland which is known as the "Quatuor Magistri," expresses the positive opinion that in time the trachea will be disintegrated and discharged. The patient must be kept absolutely quiet and avoid coughing and sneezing. Pfolsprundt recommends in such cases, freshening the wound by cutting the intestine completely through and inserting a silver tube, the blunt ends of which are larger than the middle and large enough to allow the feces to pass through it. Over this tube the cut ends of the bowel are tied with green silk thread.

He does not tell us what will become of this forerunner of the Murphy button, nor how the vitality of the intestine will be maintained, wound about as it is with many turns of the thread and the thread knotted ever so many times. He assures us, however, that a patient so treated might survive from forty to fifty years.

Like his contemporaries, he considered that a hernia was due to rupture of the peritoneum. He seems to have known scrotal hernias only. It may be possible to cure a patient over forty years old whose "intestines have gone to the kidneys"—meaning testes—but it is risky. The treatment consisted of a fifteen-day-recumbent position, or on the afflicted side with the pelvis elevated. After reducing the rupture, violent exertion must be avoided, the patient is frequently rubbed and bathed, and twice daily a bandage is applied over a compress consisting of four thicknesses of linen saturated and covered with a piece of dog's leather. After fifteen days the patient arises, but must move about cautiously lest he again tear the peritoneum. He must continue to wear the bandage for four weeks more, and during this time he must not put on or take off his shoes, must not jump, wrestle, throw stones nor ride.

Perhaps his best chapter is that on the treatment of fractures. It gives evidence of great experience and shows him to be cautious and circumspect, paying great attention to details and anticipating possible accidents. Two assistants are directed to make extension and counter-extension, especially when the fragments have passed one another, i. e., are dislocated or overriding. "It is better," says he, "for the assistants to pull the leg a little too much than too little, for it will return to its place afterwards." After the fractured ends have been brought together properly with the hands, he spreads a bone plaster over the site of fracture and over this he applies a splint of felt covered with linen. Or he sews together four or eight thicknesses of paper, which have been perforated, and over this places four or five wooden splints. If the fracture is "open or has a hole," he advises a linen-covered splint of perforated felt, which does not encircle the entire limb, but is held round it by tapes. The felt splint must have an opening larger than the wound in order to

permit the daily cleansing of the wound through it. There should be in readiness two such splints in order to enable the attendant to cleanse one when it has become soiled by pus. The splints must never be put on too tightly, and should be renewed after the fifth, sixth or seventh day, as well as the bone plaster. After the fifteenth day, or about this time, the patient should be bathed every third day and the plaster removed by means of soap. As a precautionary measure, the patient is lifted into and out of the bath in a trough or upon a board. To prevent swelling, he winds a narrow bandage from the fingers or toes to above the site of fracture.

When a leg or an arm heals with shortening and deformity—"becomes too short or crooked," as he expresses it—oily fomentations applied to the fracture will soften the callus in about fourteen days to such an extent as to enable the surgeon to refracture the bone whilst the patient is lying in a warm bath, in which, in stubborn cases, he must remain for three days and four nights.

In cases of dislocated shoulder he advises "not to let the shoulder get cold, but hurry with the reduction." If the luxation is three to six days old you cannot reduce it without much injury and pain. Before attempting to reduce such a one, the patient must be bathed for a day or two in "good herbs," and the reduction attempted immediately after leaving the bath. After five weeks it is questionable whether a luxation can be reduced. In such cases he advises warm full baths in which the patient should remain all day for from six to twelve days, at the same time making warm fomentations of herbs, and at night applying to the shoulder the plaster which he recommends for softening of the callus in cases of faulty union. After this preliminary preparation, the patient is seated upon the floor and a piece of wood is placed upright from the floor into the axilla and a second board is tied to the arm. Two assistants press the shoulder downwardly, whilst the operator grasps the arm near the shoulder with one hand and with the other near the elbow. He gently elevates the arm at first and then depresses it forcibly when the head will glide into the cavity. A large ball is tied into the axilla and the arm carried in a sling.

In injuries involving the joints, especially the knee and elbow, when you know or fear that the joint will not be entirely restored, you should tell the patient that you will do the best you can for him, but you should not hold out to him that you can restore the joint. You should have an understanding with him, both because it will be useful and because it will subsequently prevent trouble, as to whether he wishes to have the limb straight or bent, and according to his wishes you will heal it. But if he asks your advice, tell him that it will be more serviceable slightly bent, because when it is straight it interferes with walking and riding. In fact, it is easier to make a limb, which has healed crooked (bent), straight than to bend a straight one.

He describes how to perform only two bloody operations—namely, for harelip and for restoring a lost nose. His directions for operating on harelip are simple and to the point. The armamentarium consists of a sharp knife, or scissors, wherewith to freshen the edges some distance from the margin, and if necessary the wound is made larger in order to secure the accurate approximation of the wound surfaces which are held together by sutures; and, if a suture is inserted on the inner side, the union becomes still more accurate.

From the standpoint of history his description of rhinoplasty forms the

most important chapter of the book, because it is the first recorded description of the procedure concerning which neither Branca, the inventor, nor his son Antonio, who modified it, nor any contemporary has written.

Branca, a surgeon living at Catania, Sicily, during the first half of the fifteenth century, was undoubtedly the first to restore noses which had been lost by traumatism. He took the flap either from the forehead or the cheek, for *ex ore* might mean either. Antonio, the son, formed the nose out of the skin of the upper arm and added cheilo- and otoplastic work.

Whether Branca invented the procedure or whether he learned of the performances of the physicians of East India, who practised rhinoplasty from the remotest times, is a question the discussion of which has produced literature of no mean proportions.

Pfolsprundt's description of the operation is as follows:—

First a model of the proposed nose is made of parchment or leather of the size of the lost member. This model is laid upon that part of the upper arm which, by raising and approximating the arm to the face, has been found to be the most suitable, and then the outlines of the model are traced upon the skin with ink or some other coloring material. The portion of the skin thus marked is separated with a sharp knife from above downwards, so that the lower portion which will serve as a bridge, or pedicle, extends the width of two fingers beyond the lines of the model. This portion of the skin is not severed; it remains attached. Then the arm is brought up over the head and the flap is united with the surface of the nose by sutures, and the arm and head immobilized by means of bandages. On the eighth or tenth day after union has occurred, the pedicle is severed in such a manner as to furnish a flap of sufficient size to unite it with the upper lip and to furnish the two nasal openings. The skin is properly trimmed, and by freshening the upper lip the pedicle is attached to it. Two quills covered with flax are then inserted into the nasal openings. The nose is moulded into proper shape by pressure made with properly weighted small bags. The comfort of the patient is greatly conserved by making the flap sufficiently long.

After cicatrization of a wound, following the loss of the nose, has occurred, Pfolsprundt advises converting the scar into a fresh wound. Pfolsprundt's method is that of Antonio Branca, who first advised using the skin of the arm. Who taught our author this method, he divulges only in so far as he tells us that he learned it from a *Walen, i. e.,* a Welshman—an Italian, who had helped many people and had earned much money by it.

About one hundred and twenty-five years later, in 1583, Tagliacozza described the operation, which has since borne his name, in his work entitled "Gasparis Taliacotii Bononiensis": *De curtorum chirurgia per incitionem libri duo. In quibus ea omnia quae adhuius chirurgiae narium scilicet aurium ae labiorum per insistionem restaurandorum cum theoricen tum practicen pertinere videbantur clarissima methodo cumulatissime declarantur. Additis cutis traducis, instrumentorum omniumatque deligationum inconibus et tabulis. Venetiis 1583.*

His method differs in only one essential from that of Pfolsprundt. He separated the skin from the subjacent tissues, leaving it attached at both ends, and placing under it a piece of cloth, thus insuring cicatrization of the lower surface of the flap and making more certain the nutrition of the flap, as well as securing at once a permanent inner surface.

From the days when the Homeric heroes gave the wounded warriors

a drink which consisted of a mixture of wine, honey and fresh cheese, down to almost our own times, a vulnerary potion or draught played an important rôle as an adjuvant to almost every kind of surgical treatment. Similar to those who lived before, as well as those who lived after Pfolsprundt, the "draught" was of importance in every wound and injury; in fractures and hernias as well as in internal injuries. The essential medicinal ingredient of the potion recommended by him is the *artemisia vulgaris*—our mugwort. He gives minute directions as to the best time when it should be gathered and preserved in view of the climatic differences of the various sections of the country, the influence of the moon, etc. When necessary the mugwort was given as a mixture with water or beer, but best of all with wine, and usually black bryony was added, which to our taste must seem preferable to a potion prepared of rain worms, which he also lauds as valuable in cases of short breath.

His extensive experience and accurate observation led him to advise, that if an injured person was brought up in a wine-growing country, give him wine; if in a beer country, let him partake of that beverage; or if he has been in the habit of drinking water only, serve him that or small beer.

Pfolsprundt drew upon the vegetable, mineral and animal kingdoms for his materia medica. From animals he obtained the fats which he applied in so many kinds of injuries. The barber surgeon did not enjoy the help of the apothecary. He collected his own plants and prepared them, and thereby, not only kept them a secret, but added to his income. A powder made of dried toad's manure and animal excrements stood high in his estimation as a curative agent. The preparation of many of these substances required much time and labor according to the crude processes employed, for even rendering the fat of a young dog, thrown into a vessel hide and hair, must have consumed a great deal of time. He knew how to put a "person to sleep whom you wish to cut or one who is suffering from insomnia." He did this by means of narcotic inhalations; opium, hyocyamus, niger, atropa mandragora, unripe mulberries, hemlock, etc., were dissolved and sponges were then saturated with the solution. The saturated sponges were then dried in closed vessels in the sun or indoors. Before using such a sponge, it was laid into warm water for an hour and then held before the nose of the patient until he fell asleep. After using it, the sponge was dried again for future service. The patient was awakened from this sleep by holding before his nose a wad of charpie containing vinegar, fennel-seed, and olive oil.

The physicians of the Middle Ages not only knew of and practised general anesthesia, but local anesthesia as well, which latter is traceable to Pliny, the great Roman naturalist of the first century.

Many other interesting excerpts might be given of the contents of this interesting manuscript, but I have confined myself to a cursory presentation of the most important surgical topics which it contains.

After all, not all minds were clouded in darkness during the Middle Ages.

DIAGNOSTIC AND THERAPEUTIC NOTES.

OCCULT BLOOD IN GASTRIC CANCER.—Zœppritz (*Mitteil. aus den Grenz-geb. der Med. und Chir.*, Vol. 24, No. 3). Zœppritz uses only the guaiac test for the detection of occult blood, considering it, if properly done, the best of all. It should be repeated frequently, both with gastric contents and stool. A single negative test with the stool speaks against the malignancy of a gastric affection. Even in the presence of a palpable tumor, a constantly negative test for occult blood should lead to the diagnosis of adhesions following a healed ulcer rather than that of cancer. In the latter condition, a positive test for occult blood in the stool is present in 95 per cent. of all cases; it is an early sign, being present when the patient is first seen for his gastric symptoms. The rare occurrence of gastric cancer without occult blood in the stool is probably to be explained by the presence, in the latter, of unknown substances that interfere with the reaction or, possibly, that destroy the blood-pigment.

BENZOL TREATMENT OF LEUKEMIA.—Koranyi (*Berl. klin. Wochenschr.*, No. 29, 1912). Benzol, in doses of 3-4 grm. daily, has given Koranyi good results in leukemia. Severe cases may be given as much as 5 grm. daily for a brief period. Certain ill effects sometimes follow, such as gastric discomfort, eructation, temporary tracheo-bronchitis, vertigo; these may be avoided by prescribing benzol and olive oil, equal parts, in capsules. At first the treatment is followed by an increase in the number of white corpuscles, followed by a fall in their number, a shrinkage of the spleen, and an amelioration of all the symptoms. All forms of chronic leukemia seem to respond to this treatment, more slowly, to be sure, than with the *x*-ray treatment; but, on the other hand, cases refractory to the latter are often benefited by benzol. As with the *x*-rays, the good results obtained by benzol are always temporary, relapses and an ultimately fatal ending being inevitable. Nevertheless, the treatment deserves a trial both where the *x*-rays have proved ineffective and where they are inaccessible.

In one case of polycythemia, the benzol treatment was followed by a diminution in the number of the red corpuscles.

A NEW TEST FOR DIACETIC ACID IN URINE.—Ondrejovich (*Deutsch. Med. Wochenschr.*, No. 30, 1912). The importance of recognizing the presence of diacetic acid in diabetic urine is well known, in that its constant presence indicates impending coma. The tests at present in use are either cumbersome or suffer from the disadvantage that other substances, such as the salicylates, may give a positive reaction in the absence of diacetic acid. The writer has devised a test which, he believes, is free from these objections. It is performed as follows:—

To 5 c.cm. urine add 5 drops of 50 per cent. acetic acid, and enough

of a 0.2 per cent. solution of methylene-blue to give the whole a distinctly blue color. Four drops of tincture of iodide are then added, whereupon a red color results. In the absence of diacetic acid this red color is permanent; if diacetic acid is present, however, the blue color returns within a minute. The test is said to be extremely delicate and not to be produced by any of the numerous substances that simulate diacetic acid with the other methods. It may be used to obtain a roughly quantitative notion of the amount of diacetic acid present. Large amounts of this substance are present if the red color does not appear at all after adding the iodine. In this case more iodine must be added, and the greater the amount of iodine required to produce a red color, the greater the quantity of diacetic acid present. On the other hand, small quantities of diacetic acid may be inferred, if a full minute is required for the return of the blue color, especially if the latter reappears with a greenish tint.

VARNISHES IN SURGERY.—Finck (*Peterb. med. Zeitschr.*, No. 11, 1912). Whereas formerly the skin about wounds was carefully washed, it is now recognized that this merely leads to the introduction of still more pyogenic germs into the site of injury. The practice of not washing the skin but rather painting it over with an impermeable varnish, usually containing mastic, is widely prevalent especially on the continent. Finck recommends the following formula:—

R Terebinth. venet. 15.0
   Mastic. 12.0
   Colophon. 25.0
   Spir. vini (90 per cent.) 180.0
   M. filtra.

NARCOPHIN, A NEW OPIUM PREPARATION.—Straub and Zehbe (*Muench. med. Wochenschr.*, No. 28, 1912). Narcophin is a double salt of morphine and narcotine, the acid radical being meconic acid. It is crystalline, easily soluble in water and alcohol, constant in its constitution and permanent. Straub states that it is more active than opium, but free from any effect upon the respiratory centres. Zehbe also praises it, stating that it is free from all unpleasant after-effects, but that its narcotic action is somewhat weaker than that of morphine. For administration by mouth, he prescribes a 3 per cent. solution of which the dose is 15-30 drops; hypodermically 1 c.cm. of this solution may be given.

It is marketed by Bœhringer, of Mannheim, as a powder, in tablets of 0.015 grm., and in ampoules containing 1.1 c.cm. of a 3 per cent. solution.

ACETONURIA AND ITS BEARING UPON THE TREATMENT OF DIABETES.—Von Noorden (*Wien. med. Wochenschr.*, No. 28, 1912). Acetone, diacetic acid and oxybutyric acid are produced in diabetes whenever the liver contains little or no glycogen. The latter condition occurs whenever the carbohydrates are withdrawn from the dietary. After a while, however, the liver becomes able to produce glycogen from proteids, so that on a rigid diet the acetone, at first plentiful, gradually disappears from the urine. If the patient has long been on a restricted diet, the complete abstention from carbohydrates will not result in acetonuria, since the liver has already acquired this power of forming glycogen from proteids. Hence the occurrence of acetonuria, contrary to a widespread

belief, does not contraindicate a rigid, carbohydrate-free diet. The latter is useful in nearly all cases. In severe cases, the oatmeal diet is often useful, with occasional days in which vegetables are given and once in a while a day of fasting. In the worst cases, it is well to have the patient fast three or four days each month, without otherwise restricting the carbohydrates.

Medicinally, von Noorden gives sodium bicarbonate, 5 grm. daily in moderately severe cases, ten times as much in a 3 per cent. solution by rectum when coma threatens. Sodium citrate, calcium carbonate, magnesium perhydrol, may be given by mouth. He believes that coma may best be avoided or postponed by occasional days of complete fasting, during which 100-150 grm. of alcohol are given. He does not consider levulose useful.

DIRECT AUSCULTATION.—Mink (*Tijdschr. voor Geneesk.*, No. 25. Abstr. in *Deutsch. med. Wochenschr.*, No. 28, 1912). The writer has devised a stethoscope by means of which he can auscultate the respiratory organs directly. A suitable end-piece connects the stethoscope with the patient's nose or mouth and the sounds, normal or abnormal, produced in the lungs are transmitted to the observer's ear without having to pass through the chest wall. Deep-seated lesions, that cannot be detected in the usual manner, may thus be made out. Accurate localization is of course impossible.

SALVARSAN IN PERNICIOUS ANEMIA.—Bramwell (*Brit. Med. Journ.*, June 22nd, 1912). The writer reports 7 cases of severe pernicious anemia treated by means of intramuscular injections of salvarsan. Two of the patients died, one of them of a bronchopneumonia. The other five showed marked improvement, especially the first two so treated. In them the number of red corpuscles rose from less than a million to over six million, the hemoglobin from 30 to 120 per cent. This excessive number of red corpuscles has persisted in both cases for over a year without further treatment. All the cases had previously been treated by means of Fowler's solution and Blaud's pills without effect.

SPLENOMEGALIA HEMOLYTICA.—Banti (*Sem. méd.*, No. 23, 1912). Under this name, Banti describes 4 cases of a disease, differing in certain respects from the one that bears his name. The cases are characterized by a slowly progressive anemia with remissions, splenic and hepatic enlargement, light jaundice and urobilinuria. The stools remain dark in spite of the jaundice, the latter being due apparently to an excessive destruction of the red corpuscles, perhaps by a substance produced in the spleen. The treatment consists in operative extirpation of the spleen, which in all 4 cases resulted in a complete cure.

LOCAL USE OF HORSE SERUM.—Lorey (*Med. Klinik.*, No. 26, 1912). For some years Lorey has been treating diphtheria by means of antitoxin used not only hypodermically but also locally. He found that the diphtheritic lesions yielded much more rapidly when so treated. Further experience showed, however, that, for this local use, plain horse serum was just as effective as antitoxin and that it may be used with good results, not only in diphtheria, but also in scarlatinal angina and in all sorts of open suppurative processes. The serum is best used, diluted 15-30 times with physiological salt solution, and is not followed by ill after-effects, except occasionally a mild serum exanthem.

SOCIETY PROCEEDINGS.

ST. LOUIS MEDICAL SCIENCE CLUB.

The October meeting of the St. Louis Medical Science Club was held at the Barnard Free Skin and Cancer Hospital, Tuesday evening, October 15th, at 8:15 p. m. The following was the program of the evening:—

1. Lymph Formation and Edema of the Liver with Experimental Nephritis (cantharadin)....................Eugene L. Opie
2. Permeability of Animal Membranes with Special Reference to the Theory of Balanced Solutions...................J. F. Abbott
3. The Mydriatic Action of Dextro-Hyoscyamine........
   ....Robert J. Terry and Meyer Wiener
4. An Experimental Study of Some of the Sodium Salts in Shock..M. G. Seelig

(Signed) W. E. Garrey, *Secretary.*

LYMPH FORMATION AND EDEMA OF THE LIVER WITH EXPERIMENTAL NEPHRITIS—CANTHARIDIN.

By E. L. Opie, M. D., of St. Louis.

Experiments were undertaken to determine the effect of cantharidin upon the flow of lymph. These experiments were suggested by the occurrence of edema of the liver and of the gall-bladder in association with poisoning by cantharidin. After a fatal dose of the substance, the wall of the gall-bladder is swollen by edema to many folds of its normal thickness. The lymphatics of the liver and of the gall-bladder are greatly dilated and the tissues around edematous. Columns of liver cells are separated from the capillaries, and the space between contains serum and red blood-corpuscles. A study of the flow from the thoracic duct shows that cantharidin produces (a) a diminution or almost complete stoppage of the lymph-flow followed by (b) an increase of flow greatly above normal. The regional lymph-nodes of animals examined during the period of diminished flow show occlusion of the sinuses by a fine fibrinous coagulum; shreds of fibrin radiate from partially necrotic cells. Edema of the liver is caused by obstruction of lymphatics apparently associated with increased lymph formation. The experiments show that cantharidin causes, simultaneously, renal injury and increased lymph-flow.

PERMEABILITY OF ANIMAL MEMBRANES WITH SPECIAL REFERENCE TO THE THEORY OF BALANCED SOLUTIONS.

By J. F. Abbott, of St. Louis.

The "Fiddler" Crabs of the genus Uca accommodate themselves readily to immersion either in fresh or salt water, or to life in the open air. This

is due to a special mechanism for storing water in a capacious gill-chamber. When the gill-chamber is opened and rinsed out they do not live longer than four hours in pure distilled water. Under such circumstances they gain in weight by the absorption of water and lose salts to the surrounding medium by diffusion. They will live indefinitely in a mixture of NaCl and KCl of much lower concentration than that of salt water, although either salt is toxic by itself in the same concentration.

THE MYDRIATIC ACTION OF DEXTRO-HYOSCYAMINE.

By ROBERT J. TERRY, M. D., and MEYER WIENER, M. D., of St. Louis.

The action of dextro-hyoscyamine on the pupil in man is that of a mydriatic possessing little or no cycloplegic effect. Cushny's investigations of the actions of hyoscyamines showed that dextro-hyoscyamine produces mydriasis in mammals. Its action was found weak in comparison with that of the lævo form of the drug, being about one-twelfth as powerful. A dose of 0.5-0.6 mgrm. given hypodermically caused dilatation of the pupil in a cat weighing 2,700 grm. The reaction of the drug on the human pupil apparently has not been reported. The results of our experiments show that dextro-hyoscyamine causes dilatation of the pupil in man beginning in from fifteen to twenty minutes after instillation in the eye. The maximum effect is attained in from forty to sixty minutes, lasting from two to four hours. The pupils regain their normal condition in from twenty to thirty hours. It was found that this drug so administered exerts little or no effect upon accommodation. The advantages of dextro-hyoscyamine are therefore (1) its rapid action and power of dilating the pupil to its maximum; (2) its negative effect upon accommodation; (3) its fleeting action. Experience with 500 cases has demonstrated no toxic result.

AN EXPERIMENTAL STUDY OF SOME OF THE SODIUM SALTS IN SHOCK.

By M. G. SEELIG, M. D., of St. Louis.

This paper dealt with the blood-pressure raising effects of acid sodic carbonate, sodic carbonate, acid sodic phosphate, basic sodic phosphate, sodic hydrate, and finally with the effect of direct intravascular injection of carbon-dioxide gas.

The carbonates caused a marked rise of blood-pressure, which was more pronounced in the case of the acid salt. This rise of pressure was fairly prolonged in effect. It was accompanied by an increased amplitude of heart-beat and depth of respiration.

By control experiments with the various other salts mentioned above, it was possible to determine that this rise in pressure was not due to bulk, to alkalinity of solution, to hypertonicity, or to the setting free of carbon-dioxide gas in the blood.

CORRESPONDENCE

LONDON LETTER.

By F. G. CROOKSHANK, M. D. Lond., M. R. C. P.

At the recent meeting, at Dundee, of the British Association for the Advancement of Science, the proceedings were of more than usual interest to medical men. Prof. Schaefer's presidential address, on the origins of life, gave rise to lively discussions in the press, some echoes of which have doubtless, ere now, found their way across the Atlantic. General opinion, however, even amongst scientific men, is certainly less "materialistic" than it was a few years ago. In part, no doubt, this is because we have become more accustomed than formerly to the notion that matter is an expression of force. The influence of this conception is certainly making itself felt, even in the region of therapeutics. Thus doth the pendulum swing!

The address given at Dundee, by Dr. Keith, the Hunterian professor at the Royal College of Surgeons, is of some practical importance to us all. The subject was the antiquity of man; and the paper is published in full in the *Lancet* of September 21st. Prof. Keith, in discussing the probable antiquity of mankind, laid stress on the various "types" that anthropological research has revealed to us; and, while admitting that Nature has at her command, through interference with the pituitary and the thyroid, a means of definitely transfiguring, in the course of a few years, the physique of any individual, yet went on to say that he saw no signs of Nature having resorted in the past, or resorting at the present day, to any such means with the purpose of accelerating the rate of human evolution. A commentary on this statement is involved by a notion that I happened to put forward in the *Lancet* during last June, and which I see had already been formulated by Dr. Cushing in his new book. Dr. Cushing's point is that there is clinical evidence to suggest that functional instability of the pituitary may be transmitted hereditarily. He has seen many such cases. I know of two or three. Of course, in the case of endemic dystroidism, such transmission of a glandular dystrophy is well recognized, although we have been in the habit of ascribing the cretinism of the child to the operation of the same cause as that which produces the goitre in the mother. Still the question may well be raised, whether the presence in the placental blood-stream, and in the breast-milk, of normal hormones from the mother, is not necessary for the proper development of the child's ductless glands. There is experimental evidence to suggest that this is so. Certainly, if it is the case, we have obviously a mechanism for the production of very rapid change in racial characters; a mechanism which is not quite that of transmission of acquired characters, and which outstrips any such mechanism in the far-reaching nature of its effects.

A related point is that of the proof, recently given us by Chalmers Watson, in the *Quarterly Journal of Experimental Physiology* (No. 3, 1912) that histological changes can be induced in the thyroid of animals by variation in the nature of the food given them. It has already been suggested, on clinical grounds, that alterations may be determined in the functional activity of the pituitary by variations in feeding. So that, adding these facts together, and bearing in mind what we know about endemic goitre and cretinism, it is easy to imagine how, if in early days in the history of our race, scattered bands of men were driven, by stress of circumstances into districts where the food and water-supply was restricted and peculiar, in a very few years the tribal characteristics may have been completely altered by pituitary, thyroidal, or other dystrophic changes.

And, rather curiously, a sidelight is thrown on this question by a paper written by Regnault, in the *Progrès Médical* of September 7th, 1912. Regnault tells us that many observers have recently correlated certain physical peculiarities of the peasants in different parts of France with the geological formation of the soil on which they live. For instance, where the geological formations are granitic or argillaceous, and the soil is poor, and there is no imported food, the crops are restricted in nature; and the indigenous inhabitants suffer from skeletal and other changes that are really due to hypocalcification of the system. Indeed, these peculiarities of physique may be so marked that Regnault raises the question whether anthropologists may not in the past have busied themselves about what they took to be evidences of different races of mankind, when they may have been really only dealing with skeletons modified in response to peculiarities of the local geology, and the mineralization of food and water. So it would seem that we should not too positively assert that Nature has not sometimes rapidly changed the physical characteristics of a race. Moreover, and this is a point of present-day interest, we must apparently admit, not merely the necessity for the presence in foods of the tiny amounts of those elusive substances whose absence seems to induce beri-beri and scurvy, but the influence of hitherto unconsidered trifles on the ductless glands of a parent, and so, on the child—a point that is discussed in the *British Journal of Children's Diseases* for November, 1912.

Certainly, there is a growing feeling that we can no longer seek to express the whole value of a dietary in percentages, proportions, and in calories.

But to-day the practitioners of Great Britain are more concerned with the problem of whence will be forthcoming their own bread-and-butter for next year. In order that the decks may be clear for action, and that one means of escape from his dilemma be denied to Mr. Lloyd George, practically every doctor who does any "club practice" has given notice of resignation to take effect on January 1st, 1913.

The immediate result of this will be that, unless an agreement be speedily arrived at for the working of the Insurance Act, not only will the working classes next year be without the "rare and refreshing fruit" promised them, but they will no longer have their "club-doctors" to treat them on the old terms. And what the effect will be on medical practice, no man dare prophesy. Both parties to the great dispute—the doctors and the Government—seem determined. Obviously, one of the two must give in, or there must be a compromise. All we can say is "the end is not yet."

October 10th.

BOOK REVIEWS.

A HANDBOOK OF MEDICAL DIAGNOSIS. In Four Parts: I. Medical Diagnosis in
General; II. The Methods and Their Immediate Results; III. Symptoms
and Signs; IV. The Clinical Applications. For the Use of Practitioners
and Students. By J. C. Wilson, A. M., M. D., Professor of the Practice of
Medicine in the Jefferson Medical College, and Physician to Its Hospital;
Physician to the Pennsylvania Hospital; Physician in Chief to the German
Hospital, Philadelphia. 418 Text Illustrations and 14 Full-page Plates.
Third Edition, Thoroughly Revised. Philadelphia and London: J. B. Lip-
pincott Company. Price, $6.00.

The short period in which the first two editions of this work have been ex-
hausted is eloquent tribute to its worth. The third edition contains a number
of revisions and some parts have been rewritten. The chapter on anterior
poliomyelitis has been brought up to date by incorporating the knowledge gained
from the recent work of Flexner and Lewis. The section on pellagra has like-
wise been recast in keeping with the importance which the disease has as-
sumed in the United States. A chapter on the electrocardiograph has been
added, including a number of cuts of typical electrocardiograms. The general
arrangement of the work is the same, Part I comprising a consideration of
medical topography and case taking; Part II containing the technique of the
usual and special methods of examination, including the examination of the
urine, blood, exudates, etc.; Part III takes up in anatomical order the inter-
pretation of morbid symptoms and abnormal physical signs; and in Part IV
each disease is considered separately from the point of etiology, symptomatology
and diagnosis. The work contains more than 1,400 pages and as a textbook
for students leaves little to be desired.

MINOR AND EMERGENCY SURGERY. By Walter T. Dannreuther, M. D., Surgeon to
St. Elizabeth's Hospital and to St. Bartholomew's Clinic, New York City;
Ex-House Physician and Surgeon, Jersey City Hospital, etc. Illustrated.
Philadelphia and London: W. B. Saunders Company. 1911. Price, $1.25.

This book is well written and should prove a valuable first aid guide to an
interne who goes on his surgical service without much preliminary experience.
Few manuals give as sound surgical advice, and the little niceties of practice
are well illustrated and described. From the chapter dealing with fractures
of the skull, the novice might form some idea of what his chief would do when
caring for a cranial injury, but he could hardly be expected to venture a diag-
nosis; in fact, the author gives expression to the idea that in such cases it is
the fracture of the skull that needs treatment rather than that the injury to
the brain be prevented or relieved. In passing, it might be noted that the drop
method of introducing salt solution into the bowel is not given.

THE SURGERY OF ORAL DISEASES AND MALFORMATIONS. Their Diagnosis and Treat-
ment. By George Van Ingen Brown, D. D. S., M. D., C. M. Oral Surgeon
to St. Mary's Hospital and to the Children's Free Hospital, Milwaukee;
Professor of Oral Surgery, Southern Dental College, Atlanta, Georgia, etc.
etc. Illustrated with 359 Engravings and 21 Plates. Philadelphia: Lea and
Febiger. 1912.

The remarkable progress which surgery has made within the last few decades
has, as a matter of necessity, evolved innumerable specialties among which oral
surgery is one of the latest additions. It has often been said that the dentist,
on account of his intimate familiarity with oral diseases and their adnexa, and
his highly developed dexterity, possesses special fitness for the practice of oral
surgery. It should be remembered, however, that the successful practice of sur-
gery is not merely dependent on a thorough acquaintance with anatomy and
highly developed skill, but on constant practice and experience gained only by
daily attendance in the surgical operating-room. A dentist, whose time is prin-
cipally occupied with the performance of purely dental operations in his office,

will probably never acquire the skill nor the experience which is essential for the practice of the various operations about the mouth and the jaws. Nevertheless, it is essential for the dentist as well as the medical practitioner that he should possess a full understanding to recognize the diseases of the oral cavity and the associated parts so as to be prepared to give suitable directions, if they are indicated by the seriousness of the case.

Dr. Brown has made an effort to present a work, usually understood to belong to the domain of the dental surgeon, in a clear, flowing style, accompanied by excellent illustrations so as to make easy the comprehension of the operative procedures. The work is to be highly recommended to all who are interested in this latest specialty of surgery, and its careful perusal will be rewarded by unusual profit.

X-Ray Diagnosis and Treatment. A Text-Book for General Practitioners and Students. By W. J. S. Bythell, B. A., Cantab., M. D. Vict., Hon. Physician to the Ancoats Hospital, Manchester (Electrotherapeutic Department); Medical Officer to the X-Ray Department of the Manchester Children's Hospital, etc. etc., and A. E. Barclay, M. D., Cantab., M. R. C. S., L. R. C. P., Medical Officer to the Electrical and X-Ray Departments Manchester Royal Infirmary, etc. etc. New York: Oxford University Press. 1912.

This is undoubtedly the best book in the English language which presents analytical interpretations of x-ray negatives. The text is not burdened with descriptions of apparatus. The illustrations are half-tones of more than average quality. This book can be heartily recommended both to radiologist and physician.

The author's conception of the attitude between the radiologist and practitioner is given unusual space in the preface. To-day, the radiologist has passed from the x-ray photographer into the interpreter of x-ray findings. An intimate knowledge of physiology, anatomy and pathology is necessary if interpretations are to be accounted reliable. Therefore, the radiologist has acquired a more dignified position than in the early days of the x-ray.

The chapters upon bone and genito-urinary radiography are very good. Some fault might be found with the meagreness of the chapters upon fluoroscopy and sinus diagnosis. The latter fails to include much of value in mastoid and sphenoidal diagnosis.

The book taken as a whole is so far superior to anything that has appeared in the English language that a cordial welcome should be extended to it.

The Blood: A Guide to Its Examination and to Its Diagnosis and Treatment of Its Diseases. By G. Lovell Gulland, M. A., B. Sc., M. D., F. R. C. P. E., Physician to the Royal Infirmary and to the Royal Victoria Hospital for Consumption, etc. etc. and Alexander Goodall, M. D., F. R. C. P. E., Lecturer on Physiology and on Practical Medicine at Surgeons' Hall, and on Diseases of the Blood in the Edinburgh Post-Graduate Courses in Medicine, etc. etc. With 16 Text Illustrations and 16 Colored Plates. Edinburgh: Wm. Green and Sons (E. B. Treat and Company, New York). 1912. Price, $5.00.

The technical and histological portions of the subject are briefly treated, the most usual methods and appearances being described, while the reader is referred elsewhere for less usual methods and lesions. The clinical portion, however, as is often the case in English books, is of much greater value, being entertaining, based on personal observation, and showing the sane and clear-headed judgment characteristic of the best type of English physician. The type is excellent, the paper beyond cavil, and these good points, in connection with the undoubted value of the contents, make a volume that cannot be too highly recommended, despite the reservation made in this criticism in regard to the lack of description of the less usual methods and lesions.

A Text-Book of Gynaecological Surgery. By Comyns Berkeley, M. A., M. D., B. C., Cantab., F. R. C. P. Lond., M. R. C. S. Eng. Gynaecologist and Obstetrician to the Middlesex Hospital, etc., and Victor Bonney, M. S., M. D., B. Sc. Lond., F. R. C. S. Eng., M. R. C. P. Lond. Assistant Gynaecologist and Assistant Obstetrician to the Middlesex Hospital. With 392 Figures in the Text from Drawings by Victor Bonney, and 16 Colored Plates. New York: Funk and Wagnalls Company. 1911. Price, $5.00.

In this volume its authors describe and illustrate—mostly by means of unusually good black and white drawings—the operative methods used by them in the Middlesex Hospital and in the Chelsea Hospital for Women. They have

produced not only a splendid textbook for students or practitioners desirous of information in gynecological surgery, but a work of distinct interest to the specialist. In general, the operations described are those commonly practised also in this country. Nevertheless, certain differences are rather striking, to wit: their method of perineoplastic operations, the abandonment of catgut as bad and treacherous material, and of gauze wicks for drainage. Chapters devoted to such careful and painstaking consideration of the after-treatment, of postoperative complications, of immediate and late results, etc. are not often found in similar works, and greatly enhance the practical value of this volume.

THE OCULAR MUSCLES. A Practical Handbook on the Muscular Anomalies of the Eye. By Howard F. Hansell, A. M., M. D., Professor of Ophthalmology in the Jefferson Medical College, etc., and Wendell Reber, M. D., Professor of Ophthalmology in the Medical Department of Temple University, etc. With three plates and eighty-two other illustrations. Second Edition, rewritten, enlarged. Philadelphia: P. Blakiston's Son and Co. 1912. Price, $2.50.

"Since the authors presented their first edition of a 'Handbook on the Muscle Anomalies of the Eye,' the interest in this subject has grown and new problems have arisen, which, to-day, demand solution and suggestions for their practical relief." (Preface.)

The subject is treated in four parts: Part I, Anatomy and Physiology; Part II, Structural Anomalies; Part III, Functional Anomalies; Part IV, Operations on Muscles.

There is certainly no subject in ophthalmology that has received such vague and unsatisfactory treatment as that of the ocular muscles. Certain authors who have given much thought to this subject have become so fascinated with its possibilities that they have abandoned the dry plain of arid fact and risen into the blue sky of fanciful speculation. When the subject was not obscured by the mental fogginess of the writer, it was often rendered difficult by his inability to express himself with any degree of clarity. It is, therefore, greatly gratifying that Drs. Hansell and Reber have prepared a thoroughly readable, lucid, and "safe and sane" exposition of the subject. The book should be in the hands of every student of the ocular muscles.

MANUAL OF PHYSIOLOGY FOR STUDENTS AND PRACTITIONERS. By H. Willoughby Lyle, M. D., B. S. (Lond.), F. R. C. S. (Eng.), Assistant Ophthalmic Surgeon to King's College Hospital, Surgeon to the Royal Ear Hospital, Examiner in Physiology for the Primary Fellowship of the Royal College of Surgeons of England, Formerly Lecturer on, and Senior Demonstrator of Physiology in King's College. London. With One Plate and 135 Figures in the Text. New York: Oxford University Press. 1911. Price, $4.00.

The author has written a textbook, concise but complete, which may be used with advantage not only by the student but by the practitioner as well. Details of experiments have been for the most part omitted, as the book is not intended for use as a laboratory guide. The work is printed on thin paper and the more than 700 pages make up a volume of most convenient size.

ELECTRICITY IN GYNECOLOGY. The Practical Uses of Electricity in Diseases of Women. Second Edition. By May Cushman Rice, M. D., Professor of Gynecology and Clinician in the Illinois School of Electro-Therapeutics, Member of the Chicago Medical Society and American Medical Association. Illustrated. Chicago: L. I. Laing and Co. 1912.

The writer gives in this little volume, in as brief a manner as possible, the physiological action and therapeutic application of the various electrical currents used in the treatment of gynecological diseases. Scientific opinion is divided concerning the value of electrical currents in gynecological therapy, but in justice to the author it must be acknowledged that she is very moderate and conservative in her claims of good results.

CHILDREN—THEIR CARE AND MANAGEMENT. By E. M. Brockbank, M. D. (Vict.), F. R. C. P., Honorary Physician, Royal Infirmary, Manchester. New York: Oxford University Press. 1912.

The object of this book is to offer to newly qualified doctors, and to mothers and nurses, some practical advice on the everyday care of children at the nursery age. The volume seems particularly well adapted for the needs of the young mother, and can be highly recommended to the practitioner for this purpose.

A TREATISE ON DISEASES OF THE HAIR. By George Thomas Jackson, M. D., Professor of Dermatology in the College of Physicians and Surgeons, Medical Department of Columbia University and Charles Wood McMurtry, M. D., Instructor in Dermatology in the College of Physicians and Surgeons, Medical Department of Columbia University. Illustrated with 109 Engravings and 10 Colored Plates. Philadelphia: Lea and Febiger. 1912.

Dr. Jackson has written more on the diseases of the scalp than any other American author. In this book, he has with him Dr. Chas. Wood McMurtry, who is a trained laboratory man.

The book is an exhaustive study of the diseases of the hair and contains a number of most excellent illustrations. The treatment of ringworm of the scalp with x-rays is especially dealt with and minutely described.

The book is not too technical for the ordinary reader, and seems to the reviewer to meet every demand and to be a most excellent and practical treatise of the numerous diseases of which it treats.

MANUAL OF PRACTICAL PHYSIOLOGY. Designed for the Physiological Laboratory Course in the Curriculum of the American Association of Medical Colleges. By John C. Hemmeter, M. D., Ph. D., LL.D., Professor of Physiology in the University of Maryland, Baltimore; Member of the Physiologic Society of Germany (Deutsche Physiologische Gesellschaft). With 55 Illustrations. Philadelphia: P. Blakiston's Son and Co. 1912. Price, $2.50.

The author has aimed to include, among the experiments described, an adequate number of those dealing with the newer advances in physiology. At the same time he has selected from the domain of the science those experiments illustrating the basic truths rather than a great mass of individual facts which could only leave the student confused. The technique of the experiments is indicated in a clear and concise manner and the numerous cuts are a great help in the matter of elucidating any points which might be obscure to the reader not well versed in physiology.

INFANT FEEDING. By Clifford G. Grulee, A. M., M. D., Assistant Professor of Pediatrics at Rush Medical College (in Affiliation with the University of Chicago); Attending Pediatrician to Cook County, Provident, and St. Bernard's Hospitals, and to the Home for Destitute Crippled Children, Chicago; etc. Illustrated. Philadelphia and London: W. B. Saunders Company. 1912. Price, $3.00.

This is a very excellent manual. The author discusses the subject of infant feeding, not only from the standpoint of American pediatric thought, but also from that of continental authorities. The recent very valuable work of Czerny and Keller and the Finkelstein school is considered in detail, and the book really forms an epitome of modern pediatric thought, concerning the very important question of infant feeding. It is a book, which a general practitioner will find most valuable as a handy book of reference.

THE PUERPERIUM OR THE MANAGEMENT OF THE LYING-IN WOMAN AND NEWBORN INFANT. By C. Nepean Longridge, M. D., CH. B. (Vict.), F. R. C. S. (Eng.), M. R. C. P. (Lond.), Pathologist and Registrar, Late Resident Medical Officer at Queen Charlotte's Lying-in Chamber. London: Adlard and Son. 1906. Price, 5s.

Textbooks rarely concern themselves with the details of the actual practice of medicine. But it is the detail which most often embarrasses, especially the young practitioner. He will find much valuable help in this volume which extensively considers the common, everyday occurrences in the management of the puerperal woman and the newborn infant. This book will prove of equal value to the nurse.

PATHOLOGY OF THE EYE. By P. H. Adams, Surgeon to Oxford Eye Hospital; Consulting Ophthalmic Surgeon to the Radcliffe Infirmary. New York: Oxford University Press. 1912.

This book is founded on a series of demonstrations prepared for men attending the course for the diploma of ophthalmology at Oxford University. It gives, without frills or furbelows, the principal facts of ophthalmic histology and pathology. Matters in controversy are not discussed. Only the simplest and most straightforward methods of fixing, embedding and staining,—such as have, in the author's experience proved efficient,—are described.

A surprising amount of sound information on the pathology of the eye is contained in the 189 pages of this little book.

INTERSTATE MEDICAL JOURNAL.

EDITORIAL.

WHAT IS GENIUS?

That the modern medical mind is a very active one is an observation that has been made before; hence this statement cannot possibly be construed by any reader as one of cleverness. But generally when this complimentary remark is made, the speaker or writer has in mind its manifold activities in the province of medicine, and not its constant outreachings in all directions in attempts to solve the mighty problems which have baffled mankind throughout the ages. Now activity, while praiseworthy on account of more reasons than need be mentioned here, is nevertheless at times so intensely ebullient that it becomes self-conceited, and to so great an extent that it oversteps its natural limitations and is quite noisy in fields where it is entirely out of place. And this is not only true of the medical mind, but also of the business mind and the literary; in fact, of all minds that feel it their bounden duty to sever the Gordian knots with which generations have tussled in vain. That there are many illustrations of what has just been written must be apparent to all who read the various monthlies and weeklies with intelligence, and cogitate thereafter on the subject of their own purblindness in being obtuse to the proper solution of intricate questions and the rare gift possessed by investigators to lift the veil from the most obscure matters. A case in point, and a very good case, indeed, is Dr. Charles B. Reed's essay, "Toxemia as a Stimulus in Literature," in the *Forum* for July, in which he shows to his own satisfaction, if not to the reader's, that the divine afflatus, so inexplicable until now, is nothing but a toxemia that 'blows' so hard on the out-of-the-ordinary literary mind that the results are works of exceptional merit which otherwise would never have seen the light of day.

It is the order of the day 'to find out things,' and, since this is an incontrovertible fact, one should not be too hard on any investigator who is bitten with the disease, and whose sincerity is of so high a quality that no one could possibly be justified in saying that deep thought and 'much looking up' have not been factors of great moment in arriving at conclusions. To be sure, this matter of genius has been a will-o'-the-wisp to the greatest minds in all ages, but so has the mystery of the origin of life; and has not this been explained quite satisfactorily of late by two men of science—Professors Charlton Bastian and E. A. Schäfer in their respective books, "The Origin of Life" and "Life: Its Nature, Origin and Maintenance"? And, if a modern medical mind, by means of its magic wand, sees fit to dissipate the mists which have engulfed the truth as to the origin of genius, should we not rejoice? At least, we know now that both life and genius are not subjects rebellious of interpretation, in fact are explainable, especially as regards the latter, on grounds which must prove satisfactory to the materialistic mind of every democratic physician who has always regarded the matter of genius as an attribute to be deprecated, since it raises the man, whose hull contains it, altogether too far above the butcher or the baker.

But, on closer view, would it be wrong to attack some of Dr. Reed's contentions? In the first place, although he denies that "the examples selected were chosen cunningly," and adds "it is hardly possible on the contrary to choose subjects who are not addicted to artificial systemization in some form or degree," and then says "the coincidence of certain diseases with intellectual and artistic achievement is too frequent to be accidental and too potential to be without significance," we nevertheless feel that the men whom he selected were singled out because they strengthened his position; but is this proof "that the results of functional performance, especially in artistic fields, are definitely tinctured by the optimism or pessimism that characterizes the action of the toxin"? Of course, we know that Robert Louis Stevenson, John Addington Symonds, John Keats (not mentioned by the author, by the way, though an excellent illustration on account of some immortal lines in the "Ode to a Nightingale") were tuberculous, and have been told that the toxin may have had some bearing on the excellence of their works; that Heinrich Heine, who contracted syphilis when a young man, a fact overlooked by Dr. Reed, reaped all the ills of this disease, some twenty years after, on a sick-bed which the poet called his "mattress grave," and whence issued some of his most exquisite verse; that Charles Baudelaire was an opium and hashish eater and Edgar Allan Poe addicted to opium and alcohol; but, even with all this knowledge and quite willing to admit

the possible value of toxins as stimuli in extraordinary mental efforts, we cannot forget that Balzac wrote quite well, that Goethe, Tennyson, Dickens, Thackeray and Victor Hugo did some clever work, and that both George Sand and George Eliot were no despicable figures in the realm of literature, though unassisted by a toxin. How much better they would have written had they been hosts to toxins, either of the optimistic or pessimistic variety, might be the object of an ambitious investigator's next research work; but let us warn him here that though he may think at sight that his undertaking will be easy, now that Dr. Reed has paved the way, his awakening to the real terrors of the arduous task will occur after the first few moments. But why desist, though the obstacles may appear insuperable, when the outcome might be the showing-up of these writers as literary charlatans who are greatly to be pitied because they were lacking in toxins, and greatly to be condemned because for too long they have posed before the world as geniuses, when in reality they were impostors who had the cunning to delude us into thinking that they really were great men and women.

OPINION AND CRITICISM.

THE SIGNIFICANCE OF THE CLINICAL CONGRESS.

The recent meeting of the Clinical Congress of Surgeons of North America, in New York, was given the usual amount of advertising in our lay press. We have often observed, in the past few years, that our lay press, from time to time, has become possessed of an exact knowledge of the proceedings of our medical assemblies. Now this we believe is in itself of great benefit both to our profession and the people at large, and with this thought in mind to wish an end made of the custom would wrongly express our attitude.

When, however, the general public is regaled with detailed descriptions of operations, simple or otherwise, and the names of the surgeons, well known or otherwise, are repeatedly cast before our admiring or astonished gaze, we feel that some motive, other than that of giving interesting news to the public or of advancing the cause of medical (or surgical) science, actuates the enthusiastic publisher, and we hope to be the first medical publication to call a halt to the repetition of such conditions.

We know of no step in recent years which has been of such benefit in the interests of general surgery in the United States as the founding of the Clinical Congress. The visitors and the visited, of course, reap the greatest benefit, while those of us, not so fortunate as to be able to attend, are benefited in no small way even though it be not at first hand, so to speak. Nothing so reawakens our enthusiasm and restores our flagging energies as a visit to our enthusiastic and busy colleagues. An interchange of ideas casts new light on old subjects.

The public in general, of course, it is which derives the most profit from such gatherings. The patient operated upon before such an audience may well consider himself fortunate. He can have no doubt as to the correctness of the diagnosis and no fear that the treatment will not be efficient, for the man (or woman) capable of performing before so hypercritical an audience must assuredly be a master in the art.

The fear has been voiced by a contemporary that an effect of such Congresses may be the implantation, in the minds of doctors in the making, of a desire for all to become surgeons, much to the detriment of the sister studies, and that this desire to excel in surgery may lead to improper preparation of surgeons or to the performance of unnecessary operations, etc.

With regard to the preparation of surgeons, we could discourse at length, but we save that topic for a future time. However, this we will allow ourselves: When our state or national law requires a special preparation and a special mark of qualification for those wishing to do

surgery, and when our state or national examining boards are taken out of politics, and when the personnel thereof shall be limited to those actively engaged in the teaching of surgery in the best University Medical Schools, then we believe, and not till then, shall we cease to have any improperly prepared surgeons. And, in the matter of unnecessary operations, we do not believe that the wilful performance of such has ever been or ever will be practised to any extent. But when surgeons and physicians come to recognize the fact that by far the best surgeon is he who, though not a brilliant operator, knows how and when to cut to restore health, and when not to cut, fewer operations will be performed, and those performed will bring more lasting benefit.

LITERARY NOTES.

In a concise and clearly written exposition of the woman question Professor Earl Barnes lays before his readers much information in his "Woman in Modern Society" (B. W. Huebsch, New York). The information is so very thorough and to the point that an excellent idea is conveyed to the reader of the real moment of the question. In recent times many books on this subject have been written, but of the number few have been effective, for the reason that the author's bias for and against has marred the subject-matter to no inconsiderable degree. Now in Professor Barnes's book this sort of blemish is not evident, since his critical mind is of so fine a calibre that prejudices are kept in abeyance. And it is well that this should be; for, if we are ever to understand the new position of woman in the social fabric, we must first divest ourselves of all those petty ideas which we have allowed to encumber the question just because of our firm belief in the static position of womankind. This sort of reasoning may be the easiest to grasp, but it is contrary to what modern philosophy preaches; and, since it is patent to all that without evolution progress on the part of the male would be impeded, it is only fair to grant the same privileges to the female. Whether woman will be benefited, or must perforce declare herself a failure because of her inability to hold on to her new position, remains to be seen. All the writings by gynecologists, sociologists and psychologists—and the number is of goodly proportions—are really predictions based on what the writers think ought to be, so that the present 'pleasant conditions may continue;' and while some of the things which have been said against the movement may have the usual grain of truth, this fact alone should not be the insuperable obstacle that is builded of many jeremiads. If we of to-day could live the mental life of our forefathers for a few hours and then revert to our present way of thinking, what would not be our consternation at what we had seen by comparison with what obtains to-day! And even at that time there must have been gynecologists and sociologists and psychologists who

were vastly troubled over some of the 'advanced ideas,' and who took much honor to themselves for being Jeremiahs. Professor Barnes bears no resemblance to any of these, be they modern or of a former day, nor is he too enthusiastic as to the outcome of the movement; but he does know and advocate many reforms, for the reason that one sex being the complement of the other—his words run thus: "This half unit, this incomplete individual, is either male or female, and from this time on, the epic of life gathers around the search of these half-lives for their complements"—the progress of "man [who] is but a half-creature" must not be impeded by "woman [who] is equally a fragment." Here, indeed, is a good basis for all who are interested in progress to build on; and, if they will but divest themselves of their narrow-mindedness, they might see things as clearly and with the same degree of intelligence as characterize Professor Barnes's able thesis.

———

If the reader of "A Doctor's Table Talk" by James Gregory Mumford, M. D. (Houghton Mifflin Company, Boston and New York) is well on in years and has been an admirer of the writings of Donald G. Mitchell (Ik Marvel)—and we take it there are numbers of physicians who have read with enjoyment "Dream Life" and "Reveries of a Bachelor"—he will turn to Dr. Mumford's book of quiet philosophy, of resignation and kindly advice, in the spirit in which one renews acquaintance with an old and valued friend. This does not mean that Dr. Mumford is a plagiarist, or that his thought is so enamored of the past that it is indifferent to present-day problems; but it does mean that he looks out on the passing scientific show in the mood which modern writings have taught us to regard as 'old-fashioned.' And since this is indubitably the case, we would warn the younger men in the medical ranks not to expect too much in the way of 'advanced' opinions driven home with lightning-like rapidity and a force that suggests a sledge-hammer, especially those who have browsed on highly seasoned viands as prepared by our medical Chestertons. But, as we said before, to older men the book will have its special appeal; and what with its optimism, its careful and truthful characterizations of Dr. Primrose, Dr. Ely, Dr. Flaxman, Dr. Consequence, Scholasticus and others, its references to such men as Ambrose Paré,—interesting and delightful pages, indeed—Voltaire, Izaak Walton and others, and its philosophy born of a contented mood, Dr. Mumford's performance is well worth while. To be a bit meticulous we would call the publisher's attention to the spelling of Sir Almroth Wright's name on page 121, which appears as "Almoth Wright," and also to the fact that we Americans in our writings are really very careless in not giving a living celebrity his full title. Were "Almoth Wright" our neighbor, this sort of familiarity might pass muster; but, since it is otherwise, the 'Sir' as a prefix is absolutely necessary. But why complain of so small a slip when nearly all our books sin in the same direction?

ORIGINAL ARTICLES.

THE TREATMENT OF HUMAN CANCER WITH INTRAVEN-OUS INJECTIONS OF COLLOIDAL COPPER.*

By Leo Loeb, M. D., C. B. McClurg, M. D., and W. O. Sweek, M. D., of St. Louis.

The experimental study of tumor growth which, as far as its method-ical and continued evolution is concerned, originated about twelve years ago, made possible a systematic analysis of the conditions on which the life and growth of the tumor cells depend, and thus laid the foundation for rational investigation aiming at the cure for cancer. Within the last decade many investigators studied the conditions under which an active and passive immunity against tumor growth can be established in the animal body, and the effect of Roentgen rays and of radium on tumor growth. One of us undertook, in 1901 and 1902, the first experiments in which the effect of various chemicals *in vitro* on the vitality of tumor cells was analyzed.** He found that it is possible to obtain, by grad-ing the strength of such a substance as KCN, a gradual decrease in the virulence of tumor cells. The recent work of v. Wassermann and his collaborators marks a most important step in advance in the treatment of carcinoma in mice. They found that a combination of selenium and eosin, after repeated intravenous injections, caused a rapid retrogression of the tumor. The effective dose was very near the lethal dose of the substance. Neuberg, Caspari and Loehe observed that various solutions of heavy metals caused a disappearance of some animal tumors; but they do not state explicitly what kind of substances they used; and al-though v. Wassermann emphasizes the labile nature of the combination he employed, he does not describe his preparation.† In our first experi-

ments we tested the effect of various copper preparations on mouse carcinoma.* The mouse carcinoma, which we use in our laboratory, is a very rapidly growing tumor, and it occurred to us that human cancer, which in most cases grows much more slowly than our mouse cancer, might be a much more favorable object for testing the efficiency of various substances. We established the lethal dose of our preparation in various species of animals, and then undertook to employ the substance in cases of human cancer.

The first preliminary experiments on human cancer were carried out during May, 1912, with the assistance of Dr. Carroll Smith. During last October and November this work was taken up on a larger scale, and we now wish to report on our result in these later investigations.**

We used a colloidal solution of copper prepared according to Bredig's method.** Each patient received daily an intravenous injection of the solution, an average of 300 to 400 c.cm. of the solution, warmed to about body temperature, being slowly introduced. Usually six, sometimes seven, injections were given each week.

The injection is invariably followed by a rise of temperature, which varies usually between 100° and 102° F. Within six hours the temperature again returns to the normal level. The rise of temperature is frequently inaugurated and sometimes followed by a more or less severe chill. By diminishing somewhat the quantity of fluid injected, the chill can frequently be avoided. The reaction becomes less after a certain number of injections have been given. Simultaneously, with a rising temperature, the pulse-rate is usually increased. In certain patients who had a tendency to irregular heart action before the treatment was begun, this irregularity may be accentuated a few hours after the injection. Otherwise, no notable changes, so far, have been observed after the injection.

On the whole, patients tolerate these injections very well, and their general condition (appetite, strength, complexion) improves. The number of erythrocytes does not decrease, but, on the contrary, probably shows a definite increase.

Effects on the Tumor.—About two to four hours after an injection, hyperemia is noticeable in the tissue adjoining the tumor. If the tumor is open, this hyperemia is accompanied and followed by an increased secretion from the ulcerated part of the tumor. The hyperemia recurs after each injection in the beginning of the treatment, and then gradually

diminishes, the increase of discharge of fluid usually ceasing three to four days after the first few injections. Accompanying the hyperemia there is present an increased sensitiveness of the tumor. After about fifteen injections the increased hyperemia and sensitiveness disappear, and the discharge becomes much less marked than it was before the beginning of the treatment. There exist, of course, some quantitative variations in the appearance and duration of these symptoms. In the report of the individual cases some of these variations will be referred to. Very noticeable was the diminution in the pain caused by the cancer, and there was no necessity of continuing the use of narcotics. The intravenous injections cause a gradual necrosis and resorption, or sloughing, of the tumor, which usually proceeds not very rapidly but continuously. In some cases a gradual diminution in the degree of retrogression of the tumor was noticeable; but so far the retrogression has been continuous, and, at least, two of our cases are very near a complete cure. We are hopeful that all the cases we are treating will be cured, although we cannot make as yet any definite statement concerning their ultimate fate.

We selected for our treatment, especially, cases in which the changes taking place in the tumor could be followed with the naked eye, but included also a few other cases, upon which we shall report later. All our cases, with one exception, had been operated upon before without success; several had been treated with Roentgen rays, likewise unsuccessfully; in one case the patient had not been operated upon previous to the injection, but had been treated unsuccessfully with Roentgen rays and other means. All the cases were almost hopeless as far as effect of any other surgical or dermatological treatment was concerned. At present, we wish to report upon eight patients who have had the greatest number of injections.

CASE I.—History number 1,132, white, male, *æt.* forty-eight. (Service of Dr. N. B. Carson.) Patient at the Barnard Hospital for the second time, complaining of growth in the side of the neck, which, upon microscopical examination, proved to be a recurrent carcinoma. The original tumor first appeared upon the right side of the tongue. Patient was operated upon eighteen months ago and half of the tongue removed. Second operation three months ago. This operation was immediately followed by a growth appearing at the side of the wound and extending into the surrounding tissue. This was an unusually rapid growing carcinoma. In a few weeks a large cauliflower mass raised above the skin level about 3 cm. and measuring about 6 by 5 cm. across. Injections were begun October 29th, 1912. After the fourth injection a marked area of hyperemia was noted round the cauliflower mass. At the seventh injection the mass had decreased slightly. After the sixteenth injection the mass was on a level with the skin and all hyperemia had disappeared. The lesion now presents a slit-like appearance measuring $3\frac{1}{2}$ by 1 cm. A mass under the chin, at the eighteenth injection, began to show evidence of necrosis in its centre; measurements were taken at this time and found to be 10 by $6\frac{1}{2}$ cm. After the twenty-second injection an incision was made across the centre of the mass and some necrotic tissue removed. No hemorrhage occurred. In four days the only remaining evidence of this mass was an ulcerated area measuring

3½ by 5 cm. At the twenty-eighth injection the entire area involved has been markedly reduced in size. Very little induration remains at any point, and those masses remaining, upon palpation, give one the impression of an encysted foreign body.

The patient's general condition rapidly improved from the start. He is now in very good condition. Injections are being continued. Patient tolerates 400 c.cm. very well.

CASE II.—History number 1,405, farmer, white, male, æt. seventy-four. (Service of Dr. N. B. Carson.) Fifteen years ago the patient was operated upon by Dr. A. C. Bernays, three years ago was operated by Dr. Paul Y. Tupper. September 5th, 1912, patient referred to the hospital by Dr. Tupper with the diagnosis of inoperable carcinoma of the right superior maxilla; examination revealed a mass at the angle of the jaw, right side of the face. A mass beneath the buccal mucous membrane is also present. Induration in the buccinator muscle is so extensive that the patient is unable to open his mouth sufficiently to eat. By pressing the cheek back, an area about 1¾ in. long and ¾ in. wide extending across the hard palate, white in color and slightly raised above the surface of the mucous membrane, is revealed. The patient suffered from constant intense pain.

The patient was treated by exposure to the *x*-ray with no improvement in his condition. October 15th, 1912, injections were begun. Patient reacted very strongly to every increase in dose. After the seventh injection the patient no longer suffered from intense pain. After the twelfth injection the patient could open his mouth and was able to eat any kind of food, and has pain only during the rise of temperature following the injection. December 2nd, after thirty-seven injections, the mass at the angle of the jaw has completely disappeared—all that remains of the mass and induration in the buccinator muscle is a few small white spots on the buccal mucous membrane. All that remains of the growth on the hard palate is three or four white spots about the size of a pinhead. The patient's general condition is very much improved and he feels much better.

CASE III.—History number 1,439, clerk, white, male, æt. thirty-nine. (Service of Dr. N. B. Carson.) Eighteen months ago patient was hit on the jaw with brass knucks. In a few weeks the patient noticed a swelling on the side of the neck. Three months later was operated by Dr. Keefer. The operation was followed almost immediately by a recurrence which was treated with *x*-rays with no result. A second operation was attempted, but not completed on account of severe hemorrhage. Third operation by Dr. Murphy at Washington University Hospital with no benefit.

Entered the Barnard Hospital, October 30th, in very bad physical condition. A large mass on the left side of the neck measuring 7½ by 6½ cm. and raised above the skin surface about 2½ cm. The glands on both sides of the neck were very much enlarged. A mass under the left ear about the size of a hen's egg, holding the ear out from the side of the head. The patient complains of a great deal of pain and is obliged to take three doses of morphine sulph. ¼ gr. every four hours before he is relieved. Temperature per rectum 104° F., patient kept in bed for twelve days, with no improvement in his general condition. November 13th: First injection given, 150 c.cm. The patient felt stimulated and more comfortable. Dose gradually increased up to 300 c.cm. on the fourth day. At this time patient had a severe chill, sharp rise in temperature, severe pain throughout the involved area and noticed pulsations on both sides of the neck. After the sixth injection patient no

longer has any pain, anodynes are not required. The patient sleeps well, has a good appetite, and is now able to walk about the ward. Measurements of the tumor mass were again taken at the tenth injection and found to be 6 by 3¼ cm. The protruding mass now presents the appearance of an empty stomach. The mass is now almost on a level with the surface of the skin, and measurements show an area 3½ by 2¼ cm. The mass under the left ear has receded so that it is no longer visible. Several hard masses are still palpable, but are now freely movable, and are no longer painful to the touch. The patient's general condition has greatly improved. His skin has a healthy pink color and he is gaining in weight.

CASE IV.—History number 1,430, white, male, æt. fifty-six. (Service of Dr. N. B. Carson.) Entered the hospital October 21st. Eight months ago patient noticed soreness about one of his teeth. Dentist removed the tooth and the wound never healed. Since then he has lost 50 lb. in weight and came to the clinic with the left side of the face involved by an indurated and inflamed mass. Patient remained in the hospital until November 23rd and steadily grew worse. November 23rd he received his first injection; measurements of the involved area at that time showed it to be 14½ by 7½ cm. At many points small nodules were found elevated above the skin and discharging thick pus. The patient's general condition improved from the first injection. The discharge greatly increased till after the sixth injection. The area of hyperemia also increased up to the fifth injection, since which it rapidly subsided. At the tenth injection swelling in the side of the face is much less than at time of first injection. The mass now measures 7½ by 8 cm. The discharge has been markedly lessened, and the side of the face no longer presents the appearance of an acute inflammation. The patient's general condition at present is very good. He now tolerates a dose of 400 c.cm. very well.

CASE V.—History number 1,422, white, male, æt. forty-nine. (Service of Dr. N. B. Carson.) Entered the hospital, October 8th, with a tumor mass covering the entire front of the chest wall, at its thickest place measuring about 2½ in. The mass is nodular and has several large ulcerating patches. The patient's general condition is very bad. He gives a history of having fallen unconscious repeatedly before entering the hospital and remained so for several hours. During this time he would have irregular and severe muscular contractions. His face and extremities would become cyanotic and remain so for two or three days; afterwards he would be up and about. Owing to the extensive involvement of the chest wall no heart sounds could be heard. The pulse was irregular and presented a typical pulse of aortic regurgitation.

The patient was first injected October 14th. After four injections the patient's general condition was improved. After the eighth injection the disagreeable odor was no longer present. A reduction in size of the tumor mass was noticeable. October 25th patient died. For two days had had no injection. Post-mortem examination revealed extensive metastatic involvement of the interventricular wall of the heart, which had caused a filling up of the right ventricle with a mass which, upon microscopical examination, proved to be tumor. The microscopical examination showed it to be a small round-cell sarcoma.

CASE VI.—Report of out-patient case. A patient with abdominal metastases after two operations for mammary carcinoma. The growth was very extensive and rapidly growing when treatment was started. At that time patient was already semi-comatose. Eleven injections were given. Injections were then discontinued. Patient died two days later. The patient tolerated 300 c.cm. of the solution with no apparent ill effect.

CASE VII.—History number 1,436, female, *æt.* sixty-nine. (Service of Dr. N. B. Carson.) Patient was first seen as a private patient by Drs. Engman and Mook on October 3rd, 1911, at which time she applied for treatment for a small, pearly growth, ½ in. in diameter, on the bridge of the nose. The lesion consisted of epithelial pearls with small ulcerations and crustings in the centre. There was very little infiltration and no secondary infection. In the right ear, involving the lower third and the meatus of the auditory canal, was a rather extensive, destructive ulceration with considerable infiltration and tumor growth anterior to the mastoid process; the submaxillary lymphatic glands were palpable. She stated that the lesion had been present on her nose for one year and in the ear for three years. She was put upon *x*-ray treatment every other day until a reaction was produced on the nose and the ear. When the reaction had subsided, the nose was well and the lesion in the ear greatly improved. After the reaction subsided she was again given *x*-ray treatment, but did not make the improvement under the second course as under the first. Gradually the tumor growth in the ear became larger and there was considerable infection of the skin with staphylococci. This infection, eczematoid dermatitis, spread over the entire face and part of the scalp, near the lesion on the ear. The eczematoid dermatitis showed little or no improvement under staphylococcus vaccines and local antiseptic applications. In all, she received 78 *x*-ray treatments, and when she was sent to the hospital, in September, the tumor of the ear had grown to twice the size, and the lesion on the nose had relapsed to its former condition.

Patient entered the Barnard Hospital with the lower half of the ear involved and a discharging ulcerated patch beneath the ear, and a tumor mass involving the seventh nerve producing complete paralysis of the right side of the face. Injections were begun November 11th; all other treatments were then discontinued. For the first six injections the patient had no constitutional reaction and no perceptible change in the local condition. After the eighth injection the discharge was perceptibly increased, the entire right side of the face very red and swollen. After the fifteenth injection the discharge nearly disappeared, skin has cleared up, and the patient says she feels better than she had for over two years.

After the twentieth injection, examination of the patient revealed a remarkable change, both in the local appearance of the lesions and in the patient's general condition. The lesion of the nose, while crusted somewhat, had not the pearly growth as seen originally; it was smaller and there was little or no infiltration. The tumor on the ear showed a marked improvement; it was about ⅓ smaller than it was eight months before; the pearly edges had disappeared; the infiltration had about gone, and, at the present time, there remains only a small granulating surface which has the appearance of a small healing wound. The glands in the neck have about subsided, and the secretion from the surface of the growth, which had never yielded to antiseptics, has about stopped; coincident with this, the eczematoid dermatitis has disappeared entirely without local treatment. We find the effect of the injections on the eczematous condition of the skin especially remarkable.

CASE VIII.—History number 3,614. (Service of Dr. M. F. Engman.) Patient entered January 15th, 1912, for the second time with a very peculiar and unique condition. Microscopic examination of sections proved the condition to be multiple carcinoma. For the following history we are indebted to the Skin Service and to Dr. M. F. Engman in particular.

Patient is only thirty-six years old, but has the pre-senile appearance of a man of sixty-five. The skin on hands and face is very atrophic and is covered by numerous plaques of keratosis senilis, and small nodules resembling

rodent nodules, ranging from the size of a pea to a dime. Many of these plaques had apparently broken down forming an ulcer with a typical pearly border. The nose had been partially destroyed. Patient has received fifteen injections. After the fourth injection a decided reaction began to take place. All the plaques of keratosis senilis have markedly changed. The first apparent effect was a lessening of the redness round the lesions, which was followed by intense soreness that soon disappeared. The crusts became detached, curled up at the periphery and finally fell off, leaving a slight redness and very superficial cicatrix. In the cancerous process on the nose the first apparent improvement was a decided shrinking of the pearly-like border, accompanied by less redness and inflammation round the entire lesion. This change was accompanied subjectively by intense itching. The crusts became narrower as the borders of the ulceration contracted. The contraction of the ulcerated surface has gradually progressed, thus lifting the left side of the lip very perceptibly. The contraction has also progressed within the nose and lessened its lumen, so that the patient complains of difficulty in breathing through these passages. Due to the contraction, the diameter of the ulcerated surface is lessened almost one-half.

Summary of the Effects of the Injections.—First, itching; second, lessening of the redness round the lesion, and less moisture; third, crusts become dry, firmer, dark brown in color, changing to black, lessened in circumference and curling up; fourth, crusts become detached and fall off, leaving redness or pigmentation at their former location. This applies to small or larger nodules. The nodules become shriveled or dried up, forming a crust and they fall off as above described. The whole process appears to be a dry cicatrization.

CONCLUSIONS.

To summarize briefly, we may state that we are now able to cause the gradual retrogression of human cancer which until now has withstood various modes of treatment; and, furthermore, that the treatment does not seem to be limited to one kind of cancer, but applicable in the effective treatment of various kinds of cancer. Some cases which we have had under treatment for several weeks seem to be near a cure, all others are progressing favorably. A definite judgment on the ultimate outcome must still be suspended at present. Patients, in which the growth of metastases is very rapid and extensive, and in which the cachexia is already very pronounced, cannot yet be benefited by this mode of treatment. We hope, however, that the further investigations which we are carrying on, at the present time, will lead to a still wider extension of the applicability of this mode of treatment. In particular, we have made preparations to test the effect of this treatment on other cases of sarcoma, and also in psoriasis.

There are two more conclusions to which we wish to refer very briefly. In the first place, our provisional opinion, which was the starting point of these experiments—that many cases of human cancer might be more

accessible to this mode of treatment than are rapidly growing mouse cancers—has been confirmed by our observations. Secondly, our experiments present very strong additional evidence in favor of the view which one of us has always upheld—namely, that there exists no essential difference between cancer of rodents and human cancer.*

*On account of this mode of treatment being still in the experimental stage, we advise that, in case it is followed, it be limited to institutions in which all means for scientific observation is available.

ADDRESS IN MEDICINE.

THE STOMACH FROM THE STANDPOINT OF THE GENERAL PRACTITIONER, THE SPECIALIST, AND THE SURGEON.*

By Charles G. Stockton, M. D., of Buffalo.

Since we have come to grasp the meaning of Henri Bergson, we learn that life itself is change, 'a becoming.' Prof. Ross, of the University of Wisconsin, points out how a selective change in pioneer life has wrought greatness in our Western states. At present, on all sides, we hear of a spirit of change working in men. Just now there is going on a rapid transformation of ideals in the industrial world, in politics and government, in social relations in general. Society is stirred by a movement of the basic stratum—that of the common people. Forces, almost subterranean, upheave, disarrange and promise to crumble the stiff and ancient crust of privilege, custom, class and convention. It long has been predicted—this evolutionary separation and rearrangement; probably like preceding upheavals, it will, after having spent its momentum in needed reforms, subside. New crusts of society, new "cakes of custom," will form. Sedimentation and apparent fixation are tendencies in human nature as elsewhere. Yet, when this social agitation has subsided, there will be left new ideals, new purposes and new preoccupations.

Do we in medicine fully appreciate that corresponding changes in sentiment have germinated and grown in our own profession? To what extent have our ideals changed? To what are these changes due? These are questions which it would seem well to examine; to which I would, perhaps, a little one-sidedly, invite your consideration. In respect to these alterations in sentiment, it seems to me that the following is notable: There is a definite atrophy, a visible shrinking, in our respect for medical authority. Where formerly there were a few leaders in thought, makers of doctrine, professional princes, before whom all kotowed, and some cringed, there are now innumerable earnest workers to whom all listen expectantly.

In part this depends on the spread of the scientific method in medicine. Like a contagion, it has infected most conspicuously the young. Scarcely more than striplings, yet they have discovered. Often hitherto unknown, sometimes humble, yet their names have extended throughout nations. At times we hear them speak in terms hardly idiomatic, or write in

*Read before the Mississippi Valley Medical Association, Chicago, October 23rd, 1912.

phrases that are syntactically idiosyncratic; yet even to those it is often wise to lend the ear. The old doctrinaires have been superseded by the patient scientist, the clever technician, and, in some vantage points, by the young and unevenly developed enthusiast in laboratory or clinic. There has been an era of shattered doctrines and of broken idols, the result of the modern outburst of science and democracy of thought. We have witnessed the outgrowth of a new perception spring from a soil enriched by the remains, the decayed structure, almost the cerements of the past; so that there have appeared through cities and suburbs, in towns and even hamlets, small so-called hospitals and laboratories, often semi-private, wherein collectively a large and increasing clientele is studied and treated. The importance of the case from a scientific point of view is no determent to the undertaking. Necessarily, the work is uneven, the result varying from satisfactory to that showing unpreparedness and inaptness. Yet these small foci of nominal proficiency are rapidly multiplying. Their growth has been attributed, not without reason, to the more recently adopted methods of education and to the influence of post-graduate schools. Admitting this, there yet may be seen a reaction against the long-established, the more authoritative, medical centers—a display of the spirit of democracy in all things: discontent with the existing order, an aversion to privilege supposed to rest with better opportunity, a whisper of that disquieting term, 'medical trust.' Justly or unjustly, a resentment is felt by the general practitioner against the powerful metropolitan surgeon, the medical consultant backed by the prestige of a great hospital, the specialist with an exuberance of fresh ideas, and, presumably, familiarity with new methods.

There is another feature that awakens the suspicion of the laity and of the general practitioner; it is the divergence in point of view, the dissociated, inimical, almost hostile attitude with which the surgeon, the internist, and the specialist respectively regard the aspect of a given case. Surely, all cannot be right. Where lies the truth? What blindness, what vision, what purpose underlies these several views? The judgment of men disagrees as to questions of politics, of investments and of medicine. In none of these can the element of purpose, of motive, pass without scrutiny. The general practitioner bearing the responsibility of selection, and not bearing a just proportion of remuneration, occupies a place that begets suspicion, that suggests delay, that leads him to misinterpret candor and baffles his discrimination. And so the forces continue to make for dismemberment and antagonism. The consulting physicians, the men strictly surgeons (and there are such), the specialists and the general practitioners, severally, are jealous for their own ideals of truth, for their own group, their own interest. Meanwhile, the democracy of science, the equality of privilege and of social rights, lead men to emphasize individual importance and the individual advantage. Just to that extent they are blinded as to some aspects of the truth; the home

trail, that which leads to the largest advantage of the patient is obscured. From such divergence there must come a reaction. For the stimulation of initiative, for the development of self-reliance, and the fresh kindling of the torch of knowledge, we should rejoice; but from the egoism that is engendered, from the incompetence that passes at par value, from the corroding selfishness of our nature, we should be delivered.

An awakening of professional conscience is inevitable. The arbitrament is not to be made by the often highly paid and especially qualified surgeon on one side and the internist on the other. It is not to be made by the specialist, with his expert knowledge, his ingenuity, his invaluable contributions to the common stores of knowledge while acquiring a precision in chemistry, a dexterity with instruments that only the specialist can acquire. It is not to be made by the general practitioner who should, and often does, assume the first place in responsibility in advising the course that is presumed to be of greatest advantage to the patient; who must continue to dwell in the neighborhood and be measured by the community, according to the wisdom and disinterestedness of his decision.

By whom, then, shall the arbitrament be made? I answer that the ultimate decision should be made not by any man, in a restricted use of terms, but should spring from the exercise of a higher and more comprehensive professional conscience. This sounds rather vague, visionary and idealistic. Let me attempt by amplification to remove the vague and the visionary, while holding to the idealistic.

In saying that the trial of a medical case, and the verdict that follows it, is one that should be placed in the court of a higher and more comprehensive professional conscience, I mean to imply that individual judgment is prone not only to fallacy, but to partiality. Just now we are seeking to satisfy this human need through betterment in qualification, through a higher standard in medical education. Now, while admitting the need of an elevated standard of medical training, and, what is of equal importance and of equal need, the attainment by our educators of a more reasonable conception of what would constitute a proper training and a living curriculum—while admitting all this, yet this is not enough. Unfortunately modern training begets vanity. It should make vanity wither; yet now it fertilizes it. A graduate from a celebrated school thinks with that school, his range of vision too often is limited to the methods, the idiosyncrasies, the narrowness that is inevitable in every school where almost exhaustive training is required in reaching perfection in the use of positive methods in the search to unveil mysterious and uncertain natural processes.

The very fineness of the training develops a snobbishness of the mind. High training does not necessarily mean high thinking. Even thinking may hasten one in the wrong as well as in the right direction. The man, who has had opportunities of the best kind: academic and professional

school, hospital service and foreign clinic—granting that he is open-minded and intelligent—is yet prone to see only one side of the truth. He is essentially an educational aristocrat. Unconsciously his preoccupations place him in a class; in that class he continues to develop strongly and one-sidedly. He has had surgical predilections and opportunities, and his vision is so modified that he perceives with surpassing celerity, and sometimes audacity, the surgical possibilities of a case. He does not see the whole case. The assistant of one of the great surgeons of Chicago—one of the world's greatest, in fact—said in my presence: "We hold that the surgeon is merely the arm of the physician, but the trouble with you internists is that you don't make surgical diagnoses." Well, I should hope not. A surgical diagnosis! Surely such a creation would be lacking in some essential part, perhaps a pylorus. How can a diagnosis be a medical, or a surgical, or a special diagnosis? In so far as it uniforms itself with one of these, it ceases to be a diagnosis; it is but the one-sided view, put in the limelight.

Of course, the danger of a particular kind of diagnosis is that it leads to a particular kind of treatment and a particular kind of result. Is it the best possible result? That is the question. Our conscience is queer. With what expenditure of travail, of care and of thought is man born, reared and placed in his social position. All that, when illness seizes him—his life—he blindly trusts to the medical profession. Do we give commensurately of travail, care and thought in disposing of this trust?

The rank and file of the profession show a discontent with the dominant, well-intrenched, and often-endowed stratum represented in the celebrated clinics. Many are convinced that there is unfairness in the arrangement. The patient, seeking the best, is attracted by the reputation of a certain hospital. The family physician brings the patient, who is received by one side of the house or another—physician, surgeon, specialist, whichever it may be. The patient passes beyond the control or influence of his home advisor; the work is done; the relatively large fee is paid; the patient falls back upon the family physician to finish a job for which he received little consideration and less compensation.

It frequently happens that some side of the case has been neglected; perhaps it demands surgical ability and has been seen only by the medical consultant; or, an operation has been hazarded uselessly when a sound diagnosis alone was needed.

The general practitioner, owing to his discontent, is encouraged to exaggerate the trouble and to become alert so as to maintain his foothold and his remuneration. That ugly thing, fee-splitting, doubtless finds excuses in some minds in which dwells the doubtful standard that one wrong justifies another.

It is hard to believe that the distortion of ethics here involved could exist amongst us except that there was the consciousness of a grievance of a fundamental character. A relief from the harmful situation and false position is desirable to all alike. How may it be accomplished?

In my judgment, the remedy lies in a closer association of the several elements concerned. It will seem but natural that the medical consultant, the specialist, the surgeon and family physician should study the case more unitedly, should divide responsibility together, should be compensated more equitably through an open understanding. It may be said that this arrangement is now the habitual practice. That I deny deliberately.

Many surgeons have salaried assistants whose business it is to occupy the field properly belonging to the specialist, to the medical consultant, or to the family physician. Certain specialists commit the same error.

To continue this is to make all men become surgeons or specialists. The rank and file will refuse to be left out. Also ultimately, it will be found disadvantageous to medicine, unprogressive, and will react on those most responsible. The remedy lies in associated responsibility. That the remedy of closer association in our work is practicable, I know from personal observation and experience. The general practitioner should be closely related to his case from beginning to end. Not to bring this about should be a mark of the greatest discourtesy. The specialist should contribute from day to day wherever expert knowledge or special technique is advantageous. Whatever course is righteous should be determined, not by the dominant voice of one, but by the candid consensus of the group. By emphasizing the voice of the family physician in such consultations there is eliminated the danger of cliques. Although granting the value of close understanding, of mutual confidence that results from habitually working with a particular small group, nevertheless the educational advantage derived from a wider method, the stimulation that this gives to disinterestedness, to higher ideals, to general results, far outweighs the former.

I am afraid lest this will be interpreted as meaning the common practice—the loose arrangement so usual, represented by a consultation with an internist on the one hand or a surgeon on the other, and in the meantime the opinion of a specialist. Not this at all! I ask for close cooperation continued through the course of the disease, where the immediate direction shall be entrusted to that one, whose particular fitness is decided upon, but where the individual steps shall be submitted to criticism of the group. Manifestly this refers to important cases in which the diagnosis and the treatment require watchfulness, responsibility, deliberation, decisive action; in which special skill, wide experience, surgical intervention may be demanded; in which the future welfare, or the life, of a patient is at stake.

I have had frequent opportunity of observing the working of good and evil in the professional management of stomach disease. This field is rich in illustrations, because derangements of the stomach form so commonly a part of pathology starting in almost any part of the economy; because disease arising in the stomach often concerns directly the physician, the specialist, and the surgeon. Few regions more generously reward the

correlated study of physiology and chemistry, of psychology and general medicine, of special technique and wise surgery. Nowhere, now that the craze for oopherectomy and for fixation of the kidney has subsided, may one so often see the unhappy results of unthoughtful surgical interference; the failure from timid negligence of needed operative intervention; especially the evil consequences of early misunderstanding, misinterpretation, and subsequent mismanagement of cases.

Numerous admirable treatises on diseases of the stomach we have; post-graduate teaching on gastric chemistry is not wanting; surgical demonstration of what Mr. Moynihan aptly names "the pathology of the living" unfolds before us every day. One proclaims: "It is the field of the general practitioner," and another, "It is the work of a specialist"; still another shouts: "Dyspepsia is an indication of a surgical disease and demands surgical treatment." According to the case, each is right and the other is wrong. Truth suffers in that the three points of view are yet too unsympathetic, too critical of each other, and too partisan.

Let us review a few conspicuously familiar, illustrative pathological instances arranged in three groups.

First Group.—A case of unrecognized tuberculosis, with gastric irritability. A specialist, after analysis of stomach contents, recognizes a gastric neurosis and treats it by lavage and restricted diet. Improvement is not forthcoming, so a surgeon is invited. He sees a reflex, secondary to chronic appendicitis, and removes the innocent organ. Following a brief period of improvement, the result of psychic impression and suggestion, the case marches on; there is now fever, cough, expectoration, heralding infiltration, softening and vomica.

Comment.—It was a case for general medicine, not one for specialist or surgeon; yet it might have been, and both these might better have studied the case jointly with the family physician until the diagnosis was established.

You may say that the instance shows crass incompetence. Not at all; the men concerned were able and conscientious, and the case is not so exceptional as it may seem.

To this illustration might be added that of a case of undeveloped Grave's disease, or that of a case of eye-strain: irregular, unsymmetrical, slight in degree; recognized but improperly corrected. Or, that of angioneurotic edema affecting the viscera, recurrent in its manifestation.

Scores of such illustrations could be arrayed, cases betraying their activity chiefly through disturbed gastric digestion, in which the symptoms are sufficiently misleading to warrant the painstaking study of a group of men; cases in which misconception leads to harmful or useless treatment, to fatal delay, or to needless surgery.

Illustrations showing the need of the specialist, and in which the general practitioner and the surgeon were inadequate, are present in the following:—

Second Group.—A case of gastric atony, with anemia, emaciation and mental depression; with constipation, slight hepatic derangement, tenderness and recurring bilious attacks.

The general practitioner perceived the denutrition, yet harmed the patient with superalimentation and chalybeates. A surgeon, noting the gastric distress, the moderate motor insufficiency, the colonic stasis and the disturbed liver, felt that the primary fault was an infected and irritable gall-bladder, and drained the useful organ with no worse effect than making it small, limiting its movements and binding it by adhesions to the surrounding parts.

In fact, the case was one for the skillful specialist, who by local treatment, carefully suited diet and general development of the patient, in the end relieved the symptoms; then, by educating the patient as to his dietetic limitations and necessities, by teaching forebearance, willingness and waiting, had the satisfaction of seeing him restored to reasonable health.

To this might be added many illustrative instances, such as the ensuing:—

A case of subacute gastritis, mistaken by the family physician for toxemia, and by the surgeon for the expression of disease below in the digestive tract.

Or, a case of achylia gastrica, mistaken by the general practitioner for chronic colitis, and by the surgeon for cancer of the stomach.

Or, a case of gastric hyperesthesia, mistaken by the family physician for gastritis, and by the surgeon for duodenal ulcer.

Comment.—Many instances could be cited showing the importance of the special skill, laboratory facilities and large experience that most specialists in stomach diseases possess. In this field the general practitioner and surgeon need wider vision than is commonly exhibited. Unfortunately, too many have but scant interest in the work, little appreciating how richly it contributes towards a rounded view both of internal medicine and surgery. It is affirmed that diseases of the stomach are a field for general medicine, not for a specialty. I admit it; yet until the subject is better known by physician and surgeon, the specialist supplies an important need.

Finally, let me refer to those cases that my esteemed surgical friends have not neglected to present as horrible examples of medical purblindness.

No one can fail to recognize their importance, and internists hail with enthusiasm the brilliant surgical achievements which have so enlightened many dark pages in pathology. Numerous are the instances that may be cited under this.

Third Group.—A group illustrating the possibilities in surgery where physicians and specialists have stumbled:—

A patient was long treated for dyspepsia by his usual attendant, who gave hydrochloric acid, bitter tonics and pepsin.

A specialist found hyperchlorhydria without discovering its source, but afforded temporary relief with alkalies, sedatives and diet.

Upon recurrence, a surgical exploration revealed a duodenal ulcer, when gastro-enterostomy was performed. This sequence of events ought not to have occurred, and yet we must admit that it is not unparalleled. In fact, it is introduced here because it is the illustration most frequently employed, although from my point of view, the lesson that it teaches is not precisely such as passes current in the self-satisfied literature of the day. Gastro-enterostomy for peptic ulcer, *per se,* is not satisfactory, and, I predict, will be superseded.

Other illustrations, equally familiar and yet more convincing, might be added. For instance, chronic indigestion in the opinion of the family physician; motor insufficiency from pyloric ulcer in the judgment of the specialist; actually, chronic cholecystitis cured by the surgeon.

Comment.—Why multiply the examples? Surely, the fair-minded men will admit that all are prone to make mistakes, that we need, each of us, the friendly and interested co-operation of others, especially competent on some particular plane of the body. For the patient, under the present organization of medicine, the cost of our getting together is often prohibitory. The only way that I see to conserve this vital interest and yet not bankrupt the patient is to work in groups, whether within or without the hospital, and have one fee for all with or without operation. Our defeats might often have been converted into victories had we adopted the sensible and uplifting course of united, closely-knit, effort in the diagnosis and management of cases.

Yet more, the spirit of modern democracy, which well might flaunt the old French legend, "Liberty, Fraternity and Equality," has invaded our profession. With its spread there will come, at least temporary, an enormous advance in mediocrity and self-sufficiency. Higher medical education cannot stop it; at best it can only hinder; at worst, it will accelerate it.

Legislation cannot control it.

The remedy lies in the united stand for a higher ideal, for a better sentiment; in an actual, not nominal, getting together in our work.

The management of an important medical case is a responsibility suited to a carefully selected committee, not to an individual who represents but one side of the truth; not to the staff of one of those clinics, whose subalterns are subsidized for the magnification of a single phase of medicine.

THE BRITISH NATIONAL INSURANCE ACT AND THE MEDICAL PROFESSION.

By Kenneth W. Millican, B. A. Camb., M. R. C. S., of London, Eng.

It had long been growing obvious that the English Poor Law System had outlived its utility as a means of providing for the poor and sick. The great evil of poverty, and of that large share of crime that is directly traceable to poverty, was becoming recognized as, in its turn, largely the product of sickness, while serving to confirm and extend the reign of sickness; thus creating a vicious circle.

Accordingly, a Royal Commission on the Poor Laws and the Relief of Distress was appointed on December 4th, 1905. This Commission, after holding two hundred and nine meetings at which four hundred and eighty-two witnesses were examined and written evidence from some nine hundred more was considered, issued its Report in February, 1909, in two parts—a majority and a minority Report, the latter representing more or less the views of the Socialist party. As a result largely of these reports the public conscience was becoming slowly awakened to the truth, that what the individual citizen is unable, not in consequence of any individual fault, but owing to the conditions of modern society, to do for himself in the way of maintaining his physical and economic efficiency, society owes it to the individual, and, indeed, to its own safety, to do for him, or better still, to assist him to do for himself. Thus it came about that the principle of State Insurance against sickness (and incidentally against unemployment, to which, however, the writer shall not further refer here) which had already been operative on the compulsory system in Germany for twenty-five years, and on a voluntary plan for twenty years in Denmark, was in the air when the Chancellor of the Exchequer, Mr. Lloyd George, in 1910 undertook to bring in a Bill for establishing State Insurance for the working classes against sickness and unemployment.

Introduction of the Bill.

The measure was introduced into the House of Commons on May 4th, 1911, as a "Bill to Provide for Insurance Against Loss of Health and for the Prevention and Cure of Sickness and for Insurance Against Unemployment and for purposes incidental thereto." It was received at first with general acclaim from the press, the public, and members of the House of Commons of all shades of political opinion. The essential threefold principle on which the Bill was founded was (1) compulsory

insurance of all employed persons, male or female, British or alien, engaged in any kind of "manual labor," irrespective of income, and of all employees engaged in other occupations whose yearly earnings are not subject to income tax (that is, are below $800.00 a year); (2) the privilege of voluntary sharing in this State insurance for those not under compulsion to insure, subject to certain conditions; (3) the insurance premiums to be made up in the case of compulsory insurance of contributions from (a) the insured, (b) the employer, and (c) the State. Voluntary insurers were to pay both their own and the employer's contributions, the State contributing its quota as before, except in the case of alien insured. Special arrangements were to be made for the army and navy, for certain classes of casual laborers, and for employees under the Crown. It was estimated that some 9,200,000 men and 3,000,000 women would come under the compulsory clause, while about 500,000 men and 200,000 women were expected to become voluntary insurers, making a total of some 13,000,000 insured persons. The machinery was to be economically worked by making use of the existing friendly societies and any others to be subsequently founded, all of which, however, would have to satisfy certain essential conditions before they could become "approved societies" under the Act.

The benefits promised were: (1) Medical Benefit: Free medical attendance throughout life, with necessary medicines, medical and surgical appliances. (2) Sanatorium Benefit: Tuberculosis (and later other diseases) was to be dealt with by treatment in sanatoria "and otherwise," the sum of $7,500,000 being allotted to assist local charities and local authorities to build sanatoria. (3) Sickness Benefit: A weekly monetary allowance, slightly less for women than for men, during sickness, incapacitating from work. (4) Disablement Benefit: An allowance weekly for either sex in case of disablement or sickness remaining after sickness benefit terminates. (5) Maternity Benefit: A lump sum on confinement for any insured woman, married or single, or the uninsured wife of an insured man. (6) Certain additional benefits to be worked out and added later when the accumulated funds should allow.

The Bill itself was a most complicated measure. It consisted of one hundred and fifty-one pages of closely printed matter and contained one hundred and fifteen clauses with nine schedules. A careful study of its complexities soon caused all classes concerned to qualify the acclamation with which it had been at first greeted, the most strenuous objections and protests coming from the medical profession, by whom—and it may be fairly said at whose expense—the medical benefits were to be conferred.

The Radical Defect of the Bill.

The radical and inherent defect of the Bill lay in the fact that the measure had been hastily put together by Mr. Lloyd George without

adequate consultation with the representative bodies of most of those classes whose interests would be so enormously affected by it for weal or woe, and in the case of the medical profession on whose hearty co-operation its success for what was alleged to be its most important function, without any consultation at all until after the Bill was framed in all its main details and then only a month before it was to be introduced—too late for any radical alterations to be made without pulling it entirely to pieces and in fact making a new Bill. This radical defect was as follows: The principle of insurance is that the actuarially estimated risks of each individual of a given body of persons should be assumed by the entire body. Mr. Lloyd George, however, radically departed from this principle by imposing the individual insured's risk, not on the body of insured at large, but on the medical profession, who would have to do the work that the eventuation of this risk would entail. Notwithstanding this, however, no effort had been made to define precisely what items were to constitute the risk so as to present them to the medical profession and ascertain on what terms they were willing to assume this risk, and to submit to a total upsetting of all pre-existing principles and conditions of medical practice. It appears to have been calmly assumed that the opinion of the medical profession was of no consequence, and that they would tamely submit to do whatever they were told, and that if they did not do so as a whole they could be played off one against another as they have allowed themselves to be played with from time immemorial. But a rude awakening was in store.

The Revolt Against the Bill.

Very soon after the introduction of the Bill a perfect storm of protest was aroused, as a realization of the injustice it would inflict in every direction began to dawn on the public mind. It was objected to on one ground or another by nearly all employers, by various classes of those for whose benefits it was presumably intended, by farmers, and their laborers, by clerks, druggists, casual laborers, domestic servants, by trade unions and the representatives of labor, by socialists, by the friendly societies, and above all by the medical profession. The British Medical Association, as representing the organized medical profession in Great Britain, the General Medical Council, a permanent Government body presiding over medical education and licensure, the British Hospital Association, representing the interests of the vast admirable voluntary hospital system of the country, and the various graduating bodies, the Royal Colleges of Physicians and Surgeons of the three kingdoms, with the medical faculties of several universities, all protested against the framework of the Bill and urged an adequate allowance of time for a thorough discussion of it, so as to minimize as much as possible the inevitable hardships it would entail on the medical profession, but their

demands were entirely without avail. The writer will now confine himself to a brief survey of the struggle between the medical profession and the Government with regard to the terms and conditions under which the most important of the Bill's benefits, the provision of free medical attendance, etc., was to be worked; and although ten months have now elapsed since the Bill was passed, although it became operative so far as the deduction of contributions is concerned on July 15th last, and the medical benefit is scheduled to begin on the 15th of January next, the medical profession so far remains obdurate and solid in its refusal to accept service on the terms offered by the Government and the conditions under which it is called on to work. And the writer will endeavor to show in the sequel that in this course it is absolutely and indisputably right.

The objections of the medical profession to the Bill were based on both public and private grounds. On public grounds it was urged that the British public could not be expected to pay twice over for the same thing, and that when employers were mulcted in a heavy weekly tax for every person they employed, and in addition would have to bear their share of the general increased taxation that the scheme would entail for the care of the sick poor, they could hardly be expected to go on making liberal subscriptions and donations to the great voluntary hospitals which alone could after all provide adequate help in serious cases or operative work. These great institutions, therefore, which, even before the Act were always heavily in debt, would either fail or have to curtail their operations very extensively. With them would be curtailed also the facilities in medical instruction leading to a lowering of the standard of medical education, as well as the great field of postgraduate instruction offered by the great number of house appointments throughout the country. The capitation system of payment had become discredited and it was feared that the Bill would tend to perpetuate the worst evils of the discredited "contract" or "club" practice; the doctor would in fact be worse sweated than ever, because the Bill as it stood placed the doctor and the control of medical and maternity benefits in the hands of the friendly societies whose harsh and grinding treatment had so long been opprobrious. The absence of any income limit, moreover, in the case of the "manual" worker would remove from the ranks of paying patients into "club" patients many artisans who had always paid their medical expenses fairly and well, thus lessening the field for private practice at the same time that it increased "club" practice on terms that were originally introduced by the profession on purely philanthropic grounds. There was no indication in the Bill as to what the rate of remuneration was to be, surely the first thing to decide. Moreover, the Bill contained no indication as to how the doctors were to be appointed, whether as whole time medical officers of the friendly societies, or whether the patient was to have a say as to what doctor should

attend him. The destruction of existing practices was also a serious consideration. In England the good-will of an established practice is usually a financial asset saleable according to conditions for a sum equivalent to one, two, or three years income. Moreover, many men doing practice in crowded industrial districts who were earning good yearly incomes found that all their patients would come under the compulsory scheme so that no private practice would remain to them at all.

On these and other counts strong pleas for delay in proceeding with the Act were put forth by the Royal Colleges of Physicians and Surgeons and the General Medical Council. The *Lancet* urged control of the friendly societies by a central body to ensure fairly uniform and reasonable conditions, and full representation of the medical profession on all committees. It pointed out that the dislocation of practice would be enormous, for patients with incomes varying from $7.50 a week upwards formed a substantial part of many fairly well-paying practices, and these would be taken away from the category of paying patients under the Bill if it became law.

On May 16th, Mr. Lloyd George announced that he had provided the sum of $21,000,000 for medical attendance, which would give a capitation grant to the doctors of $1.50 per annum for each person insured, to include the supply of all drugs, dressings, and appliances. The cost of these, it was computed, would amount to about 36 cents per patient per annum, which would leave a clear $1.12 for the doctors. On what this 36 cent-estimate for drugs is founded it is hard to see, seeing that in spite of twenty-five years' experience in working, the cost of drugs in Germany, where they are much cheaper than in England, works out at eighty-seven cents. He had also set aside $5,000,000 per annum for the maintenance of tuberculosis sanatoria, which would, Mr. George said, reduce the amount of sickness with which the medical attendant would have to deal. On May 29th (the day on which the Bill, having passed its second reading after three days' hurried debate, was referred to committee) a committee of the General Medical Council, which had been appointed to consider the Bill, presented its report which laid down eight points for amendment, the most important of which were identical in substance with the "six cardinal points" to be presently referred to.

Meantime meetings of protest by the medical profession followed one another in quick succession all over the country. The most important of these was that of the Lancashire Branch of the British Medical Association attended by upwards of 1500, the resolutions of which meeting formed the rallying point of the subsequent revolt. On May 31st, and June 1st, a special Representative meeting of the British Medical Association (which corresponds to the House of Delegates of the American Medical Association) met at Exeter Hall, London, at which over 150 representatives were present, Mr. Lloyd George meeting them on the second day to explain the Bill and hear their views. He admitted that

the whole-hearted support of the medical profession was the first condition of success for the working of the Bill, but he did not seem to impress the profession very favorably. On the vital points—the income limit, the transference of the medical benefit from the friendly societies to local health committees, and the subject of remuneration, the profession could get no satisfactory answer from him. A crowded mass meeting of the profession was held that evening at which the following resolution was unanimously passed: "That whilst approving the main objects of the National Insurance Bill, and being desirous of co-operating for their attainment, in view of the fact that the present proposals of the Government are unsatisfactory, it is the opinion of this meeting that the Government should be asked to delay dealing with the proposed medical benefits until satisfactory terms have been arranged with the medical profession."

The terms under which the medical profession would consent to accept service under the Bill were then laid down in the now famous

Six Points.

(1) An income limit of $10.00 a week for those entitled to medical benefit.

(2) Free choice of doctor by the patient, subject only to the consent of the doctor to attend him.

(3) Medical and maternity benefits to be administered by the local Health Committees and not in any respect by friendly societies.

(4) The method of remuneration of medical practitioners adopted by each Local Health Committee to be according to the preference of the majority of the medical profession of the district of that committee.

(5) Medical remuneration to be what the profession considers adequate, having due regard to the duties to be performed and other conditions of service.

(6) Adequate medical representation among the Insurance Commissioners, in the Central Advisory Committee, and in the Local Health Committees; and statutory recognition of a Local Medical Committee representative of the profession in the district of each Health Committee.

Mr. Lloyd George protested in Parliament on the second reading of the Bill that the medical opposition arose from its being misunderstood, but as the *Lancet* pointed out editorially (June 3rd, 1911) would be the case, his protest fell flat, inasmuch as incontrovertible testimony was forthcoming from all quarters as to the serious damage that was inflicted upon medical practitioners throughout the kingdom. Of this ample evidence was afforded both by the medical press (unanimously) and by the lay press. "A measure of public reform," said the *Lancet*, "which injures the medical profession in any sweeping manner *ipso facto* is con-

demned. To damage the tools is a poor way to begin a piece of constructive work." The "six points" received the formal support of the Royal College of Physicians of London and the Royal Colleges of Surgeons of England and Edinburgh.

The actual standard of revolt was raised on June 16th by a meeting of medical men of the north and northeast districts of London, which contained a large proportion of residents who would become compulsorily insured under the Bill. The meeting endorsed the resolutions and the "six points," adding, "And furthermore, in the event of the government not incorporating these main principles in their Bill, [those present] pledge themselves not to take any office created under the Act. The establishment of a fund was also suggested to support medical men who might be adversely affected by an action taken in defence of the profession.

The Association's Pledge.

On July 1st the British Medical Association circulated the following undertaking to every registered medical practitioner for signature. "I, the undersigned, hereby undertake that, in the event of the National Insurance Bill becoming law, I will not enter into any agreement for giving medical attendance and treatment to persons insured under the Bill, excepting such as shall be satisfactory to the medical profession and in accordance with the declared policy of the British Medical Association; and that I will enter into such agreement only through a Local Medical Committee representative of the medical profession of the district in which I practise, and will not enter into any individual or separate agreement with any approved society or other body for the treatment of such persons." A memorial to Parliament was also drawn up asking for postponement of dealing with questions relating to medical practitioners until satisfactory terms could be arranged for (1) the inclusion in the Bill of the ten-dollar-wage limit; (2) amendment of the Bill to transfer medical arrangements to Local Health Committees, to ensure free choice of doctor, to include an adequate number of practitioners amongst the Insurance Commissioners, on the Central Advisory Committee, and the Local Insurance Committees, and to establish Local Medical Committees.

At the annual meeting of the British Medical Association at Birmingham, July, 1911, the President pointed out that they were being told in effect that as no one could calculate the risk involved in the scheme, and as the funds to be provided under the Bill were limited, it was necessary to impose the burden not on the general taxpayer, but upon the medical profession. The General meeting of the Association endorsed the "six cardinal points" adopted at the Representative meeting.

But nothing would induce Mr. Lloyd George to delay the passage of the Bill. On October 14th, he addressed a large meeting in London,

defending the Bill, replying to his critics, and expressing his determination
to carry the Bill through or fall.

A meeting of the Representative body of the British Medical Associa-
tion was held in London on November 23rd and 24th, at which the "six
points" were again insisted on and the following resolution was passed:
"That in the event of the Insurance Bill becoming law, the British Medi-
cal Association use every possible means to ensure that no medical prac-
titioner undertake the medical attendance of and treatment of insured
persons under arrangements that are not absolutely in accordance with
the six cardinal principles of the policy of the Association."

This meeting also specifically rejected the principle of the local pro-
fession coming to terms with Local Health Committees, thus causing
sectional defeats. This is a matter of importance when viewed in rela-
tion to the subsequent regulations of the Insurance Commissioners.

Mr. Lloyd George, it must be admitted, betrayed considerable 'smart-
ness' in giving seeming concessions with one hand but making them
nugatory with another. For instance, he agreed that the administration
of medical benefit should be transferred from the friendly societies to
the Local Health Committees; but he appointed a much larger number
of friendly society representatives on the Committees without increasing
the medical members, so that the friendly societies attained a majority
over all other members, both medical and nominated put together.
Again, his lieutenant, Dr. Addison, M. P., secured the passage of an
amendment in the House of Commons making it permissible for the
Local Health Committees to establish income limits for their respective
jurisdictions. As the insured persons have always opposed such a limit,
and as they are always in a majority on the Committees, this concession
is merely illusory. Notwithstanding the strenuous opposition, however,
and the urgent pleas for delay sufficient to secure a thorough considera-
tion of the Bill, Mr. Lloyd George remained obdurate. The Govern-
ment was entangled in a coalition with two other political parties, each
having its own axe to grind, and without the support of both of which it
would not have a working majority. As a consequence, in order that the
Government might retain these allies by fulfilling its compact with them in
regard to other measures, the Bill was rushed by their aid through
Parliament without a word of discussion being allowed on thirty-nine of
the hundred and fifteen clauses and four of the schedules, and with the
most meagre discussion of the other clauses in Committee. Ninety-
three of the clauses were passed under the closure in the report stage
of the Bill, also without a single word of debate, notwithstanding the fact
that over seven hundred amendments were on the paper, about four hun-
dred and seventy of which, being Government amendments, were in-
serted under the closure without any chance of discussion. The Bill was
thus forced through both Houses of Parliament by the aid of political
mercenaries, and became law on December 16th, 1911. The Act was

scheduled to come into operation on July 15th, 1912, so far as the collection of contributions was concerned (though not as to operation of benefits), but power was included in the Act to postpone its operation to any date not later than January 1st, 1913. Medical benefit was to come into operation six months after the commencement of the Act; sickness and maternity benefits twenty-six weeks after entry into insurance, provided twenty-six contributions had been paid; disablement benefit not until one hundred and four weeks after entry into insurance and the payment of one hundred and four contributions. The following is a

SUMMARY OF THE ACT.

The essential features of the Act are as follow: From the wages of every wage-earner, native or alien, male or female, between the ages of sixteen and seventy, irrespective of the amount of his wages if he be engaged in any form of manual labor (but in the case of others employed on salary, if the salary do not exceed $800.00 a year) there is to be deducted by the employer on every pay day as premium for insurance, in the case of men, eight cents, of women, six cents. The employer shall add six cents at his own cost to each workman's contribution. The State shall add four cents in each case, not in cash, but by taking on itself two-ninths of all the expenditure on the cost of the benefits. All other persons engaged in any occupation for their livelihood, whose total income from all sources does not exceed $800.00 a year, are entitled voluntarily to insure under the Act by paying the employer's contribution of six cents as well as their own, the State adding the four cents as before. The money is collected by the sale of stamps, the requisite sum in stamps being affixed by the employer every pay day, under a penalty not exceeding $50.00, on a card supplied by the Government and called the Insurance Card. During sickness these payments are remitted. With the fund thus formed and the results of heavy impending taxation for the purpose, the following benefits are promised: (1) Free medical attendance, medicines, and medical and surgical appliances, throughout life. (2) $7,500,000.00 is granted towards the building of tuberculosis sanatoriums and a further $5,000,000.00 annually for their upkeep, whereby the insured consumptives and their dependents may be treated in sanatoria or by other means. While in the sanatorium the sick benefit (monetary allowance) will be given only if the insured has dependents. (3) Beginning from the fourth day of illness, insured men will receive $2.50 a week for twenty-six weeks, insured women $1.87 for the same period. Certain reductions are made in a few specified exceptions. (4) In the case of disease or disablement continuing after the twenty-six weeks, $1.25 a week for men and women alike during entire incapacity to work. (5) $7.50 to every insured man whose wife is confined, in addition to sick benefit if the wife is also insured, but not otherwise; also

the same sum to every insured woman, married or single, in the like event. (6) Additional benefits may be granted in the future, free, if the accumulated margin shall prove sufficient, *e. g.,* free medical attendance for dependents; dental treatment; increase of sickness or disablement benefit for those who have dependent children; payments to members who are in want and distress, convalescent allowance, increase of maternity benefit; even 'pocket money' for those who get no sick pay through being in hospital, etc.

Administration of the Act.

The Administration of the Act is consigned to the Insurance Commissioners created by the Act. Of these there are eight for England, five each for Wales, Scotland, and Ireland. A joint Committee with headquarters in London is appointed, with representatives from each of these Boards. The Commissioners are invested with large powers and are entitled to make regulations and rules which without any further parley or confirmation become part of the Act, and so of the law of the land. The Commissioners are assisted by an Advisory Committee consisting of representatives of associations of employers and approved societies, of duly qualified medical practitioners who have personal experience of general practice, and of such other persons as the Commissioners may appoint, of whom two at least shall be women. An Insurance Committee (the original Local Health Committee of the Bill) is constituted for every county and county borough, the number to be determined by the Commissioners with regard to the circumstances of the case, not less than forty or more than eighty. Three-fifths shall be appointed to represent insured persons, one-fifth by the county or borough council, one, two, or three members, according to circumstances, shall be medical men, the remaining members being appointed by the Commissioners. The Insurance Committees are to administer the medical and maternity benefits in place of the friendly societies, to make agreements with the panel of doctors willing to undertake service under the Act (but these arrangements are subject to approval by the Insurance Commissioners) and to administer the sanatorium benefit. Local Medical Committees are also to be appointed for each district covered by an Insurance Committee, which shall be consulted by the Insurance Committee on all general questions affecting the administration of medical benefit, including the arrangements made with medical practitioners giving attendance to insured persons. Insurance is to be effected (*a*) by joining one of the approved friendly societies, the society retaining its present power of rejecting any candidate on physical grounds; and (*b*) failing membership of an approved society by becoming a deposit contributor. The deposit contributor is not really insured at all, for although the same amounts are paid on his behalf as for those who belong to friendly societies, the benefits granted

him cease, except in so far as they are at the doctor's and not the Government's expense, viz., medical benefit, when the amount standing to his credit at the post office is exhausted. As the friendly societies naturally reject 'bad lives,' these will all become necessarily deposit contributors, with the result that the doctors will have the most work for, and receive the least pay from, those who most need the benefits the Act professes to provide. For the State, while declining to assume its share of the risk regarding money payments in the case of the deposit contributor beyond the amounts standing to the insured's credit, has not the same consideration for the doctor's time and labor, for he must attend the deposit contributor through life, pay or no pay. The administration of all benefits, save medical benefit and sanatorium benefit, is, subject to the approval of the Insurance Commissioners, in the hands of the approved societies as regards their own members, the Local Insurance Committees administering all benefits to the unhappy deposit contributors, as well as the medical benefits for all the insured. Insured persons will have the right to select, subject to the consent of the doctor, any member of the medical panel when formed, but insured persons who can find no doctor to accept them will be distributed by the Insurance Committees among all the doctors on the panel, so that after all there will not really be 'free choice' for either.

Continued Opposition to the Act.

The Act became law on December 16th, 1911, and December 19th the largest medical gathering yet held took place at the Queen's Hall, London, under the chairmanship of Sir W. Watson Cheyne, to protest the acceptance of service under the Act by the medical profession. During the preceding week a statement was issued by the Chairman of representative meetings and the Chairman of Council of the British Medical Association, recapitulating the "six points" agreed on at the meeting of June 1st, and asserting that "the Bill by the efforts of the Association has now been so amended that there is no legal barrier against the profession securing the fulfillment of its entire policy." The whole profession had been startled by the news that Mr. Smith Whitaker, M. R. C. S., the medical secretary of the British Medical Association, who had been conspicuously energetic in working up the case of the profession against the Bill, had been offered, and with the consent of the council of the Association, had accepted the deputy chairmanship of the Board of Insurance Commissioners under the Act. Incidentally the position carried with it the comfortable salary of $7,500.00 a year, this undertaking to assist in the working of an Act that the profession was pledging itself to hold aloof from, unless its reasonable demands were granted, and especially the support of the Council was very generally stigmatized as the "Great Betrayal" and aroused the most bitter feelings in the profession.

The meeting was a very stormy one, the few who ventured to uphold the part taken by the Council in the "Great Betrayal" receiving very summary treatment. One of these, Sir Victor Horsley, whose appearance on the platform was deeply resented, was refused a hearing. At this meeting resolutions were almost unanimously passed asserting that the Insurance Act did not guarantee the six cardinal points demanded by the profession and expressing the opinion that every medical practitioner should refuse to accept any office for giving medical attendance and treatment to persons insured under the Act until the demands of the profession had been definitely conceded. The *Lancet* tersely but forcibly summed up the situation in its *Annus Medicus*—the annual review of the year's progress—as follows: "A highly organized profession seeking no legislation on the point in question, suddenly finds itself, by certain sections of a complicated measure, involved in a struggle for existence. While the struggle is still going on, the Bill, in a manner against which no protest can be too vigorous, becomes the law of the land. We have to decide upon a common line of policy, justifying every step of our resistance. The *Lancet* of December 9th said that the Council "have endorsed, by sanctioning Mr. Smith Whitaker's new position, the working, not the principles, of a measure dangerous to the medical profession, one whose influence has not been gauged, and whose promise is full of ill omen." On December 14th, a mass meeting of upwards of 2,000 medical practitioners at Manchester passed, with hardly a dissentient voice, resolutions calling on the profession to refuse to form a panel under the Bill or to undertake any duties which the Bill proposes to assign to them; also to form a National Medical Union to deal with the conditions arising out of the Bill and strengthen the hands of the British Medical Association. At very short notice, also, a mass meeting of upwards of 700 practitioners at Birmingham called on the profession by an overwhelming majority to decline to undertake any duties assigned to them under the Bill.

In January, 1912, the *Practitioner*, after conducting a plebiscite of the profession on the question whether it was satisfied that the arrangements made for the profession with regard to the medical service now embodied in the National Insurance Bill were such as to enable it to give honest and adequate service to the insured, with the result that 20,149 answered "No," 352 "yes," and 211 replied by counter queries, circulated for signature the following pledge: "Feeling that the present National Insurance Act is unjust to the medical profession, I hereby pledge my word not to accept any service whatsoever under it. I stipulate, however, that unless at least 23,000 members of my profession in Great Britain combine with me in this pledge I shall be free from it." The numbers who signed considerably exceeded the limitation. The significance of this pledge will be seen from the following data. About 14,000,000 persons would be insured under the Act, either compulsorily or volun-

tarily. Allowing 2,000 persons to each practitioner—an exorbitant allowance, which in point of fact could not be worked under the conditions of practice—it would require at least 7,000 doctors to work the Act. The total number of registered medical men of all grades in Great Britain, exclusive of officers of the services and practitioners resident abroad, is 29,567. (This would include consultants and specialists, the house officers of hospitals and infirmaries, and those retired from practice, or engaged in other pursuits, undoubtedly numbering several thousands, who of course would not be available to work the Act.) The adhesion of over 23,000 members of the profession, therefore, would leave an inadequate number, and those the 'tail' of the profession to work the Act.

The newly appointed Insurance Commissioners summoned a conference for February 2nd, 1912, to assist them in drawing up regulations, and two members of every medical corporation (the General Medical Council, the British Medical Association, and the University medical schools and Royal Colleges of Surgeons and Physicians in the country) were invited. These bodies, however, unanimously declined to attend, and so the conference had to be abandoned. This particularly aroused Mr. Lloyd George's ire, and in a speech at a public meeting held in support of the Bill, at the London Opera House on February 2nd, he accused the colleges of "rude ineptitude." He also threatened the profession that if the doctors refused to discuss the terms with him, "all the safeguards inserted in the Act for the protection of the medical profession would be swept away at once." This was an unfortunate admission. The profession naturally asked itself what was the value of safeguards in an Act of Parliament if they could be swept away at the will of Mr. Lloyd George, and it only intensified the increasing lack of confidence in his trustworthiness, and strengthened the profession in the belief that even such safeguards as there were in the Act were illusory and might be disregarded as soon as the professional neck was in the Chancellor's noose. Mr. Lloyd George's vituperative remarks were replied to in a dignified joint letter to the *Times*, signed by Sir Thomas Barlow and Mr. Rickman Godlee, as Presidents respectively of the Royal Colleges of Physicians and Surgeons. They published in full the replies of the colleges to the Commissioners' invitation, that had so enraged Mr. Lloyd George, and pointed out that soon after the Bill was introduced into Parliament the Colleges had approached the Government and stated clearly how the Bill militated against the just interests of the medical profession. They added that the present invitation called on them to aid in framing measures of procedure for the carrying out of an Act which the Royal Colleges had consistently maintained was injurious to large numbers of their licentiates and members, and thus to the insured persons and the community. They further retorted that the charge of rude ineptitude "would more aptly be applied to those who initiated a measure vitally affecting the material and moral welfare of the medical profession

without first consulting those bodies who represent its interests and are acquainted with the conditions under which its arduous work is carried on."

Resolutions were now being passed all over the country in which medical men pledged themselves not to serve under the Act unless their reasonable demands were conceded, and the Representative body of the British Medical Association directed the Council to inform the Insurance Commissioners "in plain and unmistakable language" that the medical profession would refuse to work the Act unless the six cardinal points were conceded. The meeting also fixed the sum of $2.12 per capita annually, exclusive of drugs and appliances, as the minimum that could be accepted as "adequate remuneration." (No definite figure had even yet been fixed, but Mr. Lloyd George had suggested $1.50, to include medicines and appliances.) This Mr. George flatly refused to concede, as also the statutory income limitation, and it was further peremptorily stated that no postponement of the coming into operation of the Act would take place. The names of the Advisory Committee to assist the Insurance Commissioners were published on April 10th, and it consisted of thirteen medical men nominated by the British Medical Association, three medical women nominated by the Association of Registered Medical Women, and seventeen medical men selected by the Commissioners, including such well-known names as those of Sir Clifford Allbutt, Regius Professor of Physic at Cambridge, Sir Frederick Eve, F. R. C. S., London Hospital, Dr. Lauriston Shaw, Guy's Hospital, Dr. Norman Walker, Edinburgh Royal Infirmary, and Professor Sims Woodhead, Cambridge University.

As it now looked as though the struggle were going to be fought out to the bitter end, the British Medical Association in May asked all who had signed its original pledge to subscribe to another still more drastic one, and to place in the hands of the secretary of the association their resignations of "all club, friendly society, dispensary, and other forms of contributory contract practice appointments, so far as they extended to insured persons, authorizing him to send them to the bodies concerned when called on by the State Sickness Insurance Committee of the British Medical Association (established in February to watch the Bill and prosecute negotiations with the Chancellor). They were further asked to pledge themselves not to accept any such appointment so assigned and to accept appointments dealing with insured persons only with the consent of that Committee. And finally that until the terms and conditions of administering medical benefit under the Act shall have been approved by the profession, not to render, except in cases of urgent necessity, professional service to an insured person through any voluntary charity or to coöperate with any member of the profession who is under contract to render service to insured persons on terms which are not approved by the profession.

Meanwhile, the period at which the Act was to come into operation, viz., July 11th, was approaching and all efforts to induce the Government to consent to the postponement which the Act allowed until January 1st, 1914, had failed, and still there were no signs of an agreement with the medical profession. On May 24th, an effort by the Commissioners to entrap the profession into committing themselves into coöperating was made by a request to the British Medical Association to nominate medical members of the Provisional Insurance Committees, to arrange for the working of the sanatorium benefit, which, unlike the other benefits, was to come into operation on the passing of the Act. The Sickness Committee, however, saw through the ruse and declined to assist the Act to come into force until the six cardinal points had been included in the regulations to be issued by the Commissioners.

The Plender Report.

Meantime, Sir William Plender, the actuary who had been commissioned by the Chancellor to inquire into the average payment of medical men per head of the population in five towns where the practitioners had agreed to place their books at his disposal, presented his report. The analysis showed that 171 practitioners in a population of 408,580 persons received for medical attendance and drugs a sum equal to about $1.36 per head of the population. This was, of course, promptly seized on as proving that the Chancellor's offer of $1.50 was above the average. But it was equally promptly pointed out that if the gross amount be calculated in relation to the work done, instead of to the population per head, it was earned by only one-third of the work that according to actuarial calculations would be demanded under the Insurance Act.

On July 3rd, Mr. Lloyd George issued a statement in the *Nation*—a Government organ—in which he said that the regulations now being drafted would be found to contain provisions that should remove some of the anxious fears of the profession. He hinted at 'other alternatives' than the panel system, and, as regarded financial questions, said that "if a case is made out for a further financial provision, we are prepared to recommend the House of Commons to increase the grant."

The British Medical Association's Meeting, 1912.

The annual meeting of the British Medical Association took place at Liverpool in July. The President, Sir James Barr, in his address, said in reference to the Act: "I consider it the most gigantic fraud which has ever been perpetrated on a confiding public since the days of the South Sea Bubble. Both frauds were largely engineered by members of Parliament," a statement which was warmly applauded. At its general meeting the Association voted by acclamation to break off all further negotiations with the Chancellor as useless. A fund was also started for

the support of practitioners who might suffer financial loss through adhering to the policy of the Association, by assessing each member for a minimum subscription of $100.00, to be paid by instalments. The medical members of the Advisory Committee were called on to resign, which all those nominated by the Association did, as well as more than half of those appointed by the Commissioners, though Sir Clifford Allbutt and a few other highly respected men deemed it their duty to remain in the interests of the profession.

Mr. Lloyd George appears now for the first time to have really awakened to the idea that the medical profession was in deadly earnest. A parliamentary 'white paper' was issued on July 25th setting forth the concessions the Government were disposed to make in tardy reply to the terms demanded by the Association in February. It was stated that regulations could not legally be framed to fix everywhere a uniform income limit of $10.00 a week; that the Chancellor agreed that the average remuneration per head of insured population should be greater than under existing conditions, in view of the greater demands under the Act; and that the Government recognized that provision should be made of extras (c. g., mileage, operations, consultations, night work, etc.) and would advise Parliament to make an extra grant to meet the cost of medical benefit, still, however, without defining any amount. To this the Association replied on July 15th that there could be no coöperation until the amount of remuneration was satisfactorily agreed on. If the income limit could not legally be settled by the Act as it stood, an early opportunity should be taken to make it possible by amending the Act. The questions of fees for extra services and the amount of remuneration should be settled together, for the committee was unable to deal with the subject until it was known for what 'extra services' the Government would hold itself responsible. They further suggested that the doctors' representation on the local Insurance Committees should be made equal to one-tenth of the whole number. The Commissioners replied on July 18th that, as regarded the case of persons whose income was over $10.00 a week, the Act contained a specific provision whereby, apart from the imposition of any income limit, those who desired might be allowed to make their own arrangements for receiving medical attendance and treatment. The question of extras would be dealt with as a part of a general arrangement, if the Association was disposed to continue negotiations. The matter had to a considerable extent, they said, been amicably adjusted in the Advisory Committee (meaning the small fraction that remained of it after the secessions). The increased representation requested had not been previously raised, but the Commissioners were prepared to consider the representations in due course.

The British Medical Association, on August 2nd, issued a statement in vindication of its refusal to continue further negotiations. It pointed out that previous to the drafting of the Bill the Association was never con-

sulted by the Government, and that over twelve months of waiting had resulted only in many fair promises with little material result. The conditions considered essential by the profession, which the Government had shown no disposition to concede, were (a) freedom from lay control, (b) a $10.00 income limit, (c) remuneration at $2.08 per head, exclusive of medicines and extras. With regard to the first point it said: "It is true that the Act sets up Local Medical Committees, which must be consulted by the Insurance Committees on all medical matters. The profession regards this 'consultation' with suspicion. It may mean much or nothing." It suggested that the person earning over $10.00 a week should be given the amount of money allowed for medical benefit and permitted to make his own arrangements. Regarding remuneration, "the profession feels that the attitude of the Chancellor of the Exchequer and the Commissioners has been disingenuous and evasive." As regards the Plender Report, "those figures show that the present income of a medical man spread over the population of the towns inquired into was $1.00 a head, but this is for 1.8 attendances per annum, a figure which shows that a large number of the population are not attended to at all, or are insufficiently attended. With a system that allowed unlimited attendance with free choice of doctor the amount of attendance per head would be more likely 5 than 1.8." Attention was also called to the fact that $2.10 per head for attendance and medicine was allowed for postal servants, policemen, and firemen, all picked lives, working under excellent hygienic sanitary conditions, invalided out of the service on permanent ill health and pensioned at an age when the sickness incidence is greatest. $2.10 without medicines was, therefore, not too much for non-selected lives who must be attended throughout life. The document concluded as follows:—

"The Government proposes to set up a medical service which will at once include some twelve or fourteen million people, a large number of whom in the past have received perfectly satisfactory medical attendance by means of arrangements made direct with their own doctor. There is every indication that in the future it will be sought to include the dependents of insured persons, and that thus the service will at no distant date include four-fifths of the whole population. It thus becomes a matter not only of professional, but of national concern to ensure that the conditions now set up should be such as will give the public the choice of the best men at present in the profession, and will not tend to lower the standard of the men entering the profession. Under the conditions at present offered, the most experienced and trusted practitioners would certainly decline to serve under the Act."

With the beginning of October no settlement being in sight, the resignation by doctors of contract work throughout the country began, the resignations to take effect from January 1st; and by October 4th it was reported that out of 230 areas, 144 reported the resignations by 6,042 doctors of 22,729 appointments.

The long awaited Regulations of the Insurance Commissioners, which we were told were going to set everything right and clear away all misunderstandings and remove all doubts, appeared on October 3rd. In regard to the six points, the income limit is not provided for, but local Insurance Committees are given power to impose a limit if they think fit, suited to their respective districts. Free choice of doctor is to some extent included in the Act. The administration of medical and maternity benefits is given to the Insurance Committees. As to methods of remuneration, five plans are laid down by the Commissioners for each area to select from according to the desires of the majority. (1) Capitation, a fixed rate per quarter for each insured person on the doctor's list. (2) Capitation plus special payment for night visits, consultations, operations, and other special services. Here the capitation dues are first paid and the available balance divided up pro rata as far as it goes, to pay the special fees. (3) Capitation plus payment for services. Half the money is used in payment of flat rate, and the rest in payment of services as far as it goes. (4) Payment for special services plus capitation. Here the first charge is for special fees. The remainder is then divided up as far as it goes in payment of flat rate. (5) Payment by attendance at a fixed scale of fees. The actual figures of the remuneration are as before left unsettled. The demand for adequate representation on the Local Insurance Committees is not affected, yet the present status is quite inadequate. Other points of medical interest in the Regulations are: When further advice is desired, the doctor shall advise the patient how it may be had. He shall visit without extra charge within three miles of his residence, and shall attend at some specified place on specified days and hours. All treatment must be given personally, except when prevented by urgency of other professional duties, absence from home, or other reasonable cause. In this case some other physician is to act as deputy. The obligatory 'shall' is used, which would subject the doctor to much harassing for unavoidable dereliction of duty. Among the obligations laid on the patient are to obey the doctor's instructions and not to behave so as to retard recovery or make unreasonable demands; when their condition permits, to attend at certain days and hours at the doctor's office or residence; not to summon the doctor between certain hours, save in emergency cases; to give notice before 10 a. m. of the day in which the doctor is desired to call. Fines are imposed for the breach of these regulations.

On October 24th, Mr. Lloyd George announced what he termed his final offer, as the result of his communications with his colleagues of the Government. He proposed to set aside for medical benefit the sum of $2.22 a head to be distributed as follows: 36 cents for drugs and appliances, $1.62 capitation rate, with 12 cents additional for domiciliary treatment of tuberculosis patients, and an extra 12 cents which could be used if necessary for drugs, etc., but otherwise would go to the doctor. Thus the medical benefit instead of being $1.50 inclusive would be $1.62

for attendance only. The amount allotted for medicines, however, is according to German experience wholly inadequate, so that every prescription a medical man wrote after a certain number would be practically a check on his own remuneration. It was also proposed to establish an emergency drug fund to meet unusual expenses during epidemics. In return for this increase Mr. Lloyd George demanded free certificates, the keeping of simple case records and improved conditions of service. This, therefore, is not simply an advance in the offer but an entirely new arrangement.

Such, then, is the present status of affairs. The State Sickness Insurance Committee after a most careful consideration of the Chancellor's offer, on October 31st submitted a cogent and careful report to the Council of the British Medical Association, which accepted it for distribution among the various divisions throughout the country. They will now examine it, and instruct their respective representatives whether to vote for or against accepting service under the Act, at the special Representative meeting on November 19th and 20th. Meanwhile, January 15th approaches, the Act pledges the Government to supply free medical treatment on that date, and there seems no immediate prospect of a settlement. All present indications are that the profession will refuse to work under the Act. In that event the Chancellor must either give the insured the pittance towards their medical bills, which will leave them no better off than they were before, the main object of the Bill having been to provide "free medical attendance by the doctor of his choice"; or he must try to start a whole time national medical service, which will be difficult if not impossible, in any event will not attract the better men in the profession, and so will fail to remedy the evils of 'cheap doctoring,' and will perpetuate the disliked idea of having to go to the "club doctor."

On the other hand, if the profession tried to work the Act, it is the writer's belief that it will break down utterly; for to do the work of 14,000,000 persons as it is intended to be done, will be racking work for over 10,000, requiring all their time and allowing no opportunities for private practice. As the utmost limit of possible income will be about $2,250.00 a year for this service, and all the prizes of the profession will be out of reach, the better class of practitioners will soon hold aloof, and all the work will then have to be done by a much smaller number; with the result that there will be a profession broken in health, and a worse state of things so far as the poorer classes are concerned than was the case before the Act.

In reviewing the Act it seems clear to the writer, without questioning its beneficent intention, that so far as the medical provisions are concerned they are radically and irremediably bad, and will not only prove subversive of all professional ideals and self-respect, but will result in a grievous aggravation of the deplorable conditions in regard to the medical treatment of the poor that they were designed to overcome. They will tend to rivet on the profession in a greater degree than ever before—owing to their official character—the intolerable tyranny of the friendly

societies and of the indiscriminating part of the public to increase the loss of professional dignity and self-respect, and to result in an ultimate acquiescence in the slovenly and unworthy professional methods that have in the past degraded the so-called "club practice." All incentive to initiative and excellence will be destroyed by a service (into which all medical men not possessed of considerable private means at the start will in future be driven) that condemns all who enter it for a livelihood to an income totally inadequate for their social needs, yet whose limits they can never hope to raise, being determined as they are by the power of human endurance for work. No superior skill, no conscientious attention to detail, no inventive ingenuity, no superhuman devotion to toil can raise them above the flat rate level of their brethren. Every insurance doctor's income will be irrevocably limited by the amount represented by the capitation sum settled by Mr. Lloyd George in his 'final offer' at $1.75 per annum, multiplied by the number of people his physical capacities make it possible for him to care for.

When we consider that the doctor's service is to include unlimited attendance on some 14,000,000 workers of both sexes—not selected lives, as in the case of club members, but in the case of deposit contributors (chiefly the rejected of the friendly societies who must insure through the post office) including all aged people as well as those broken down in health by cardiac and other constitutional diseases, by venereal diseases —for diseases of misconduct are not excluded as in clubs—and even all tuberculous cases outside the comparative few who some years hence may be received into sanatoria; that a much greater degree of care and attention than in club practice is demanded, and that resort must be had to the latest methods of diagnosis and treatment; that it is admittedly the intention presently to include the dependents of the insured; that by the absence of any income limit (for it would be insanity to suppose that a committee consisting of 60 per cent. of those who have been and are implacably offered to any income limit would ever exercise their 'permission' to impose one) the number of persons in the aggregate to be dealt with will be vastly increased under a compulsory system; that the possible field of private practice will be thus deleted; that in any event there will be no time left for private practice, for actuarial computation—and that based only on selected lives, not on all lives including the aged, the infirm, and the diseased—shows that 1,000 clients entail at an exceedingly low estimate at least 6,000 domiciliary visits a year, or over 16 a day, irrespective of probably twice that number of office consultations for minor ailments, 'diseases of misconduct,' a considerable amount of work, formerly paid for, under the Workmen's Compensation Act and the Employee's Liability Act; that records of cases, however brief, have to be kept; that a large quantity of clerical work on documentary forms is laid down, and that accounts will have to be kept; when all these things are remembered it is easy to see that the following results must ensue: (1) The man who enters insurance practice will find his emoluments and his possibilities limited by the number of insured he can attend. There will be no field marshal's baton in the knapsack for him. One thousand insured

will bring him in—at Mr. Lloyd George's $1.75 per capita, if he gets that sum, for there are certain deductions to be made—$1.750.00 a year. For this he will have to do killing work, occupying his entire time. There will be no private practice because he will have time for none, and his possible clientele will be removed from him even if there were. The 'Insurance doctor' can never hope for practice among the socially higher world. Those medical men who have financially staying power to wait until they can acquire a private practice among the better classes will certainly refuse to serve under the Act, so that the profession will then be divided into two classes, to the greater part of which all the possible positions of influence or great emolument will be permanently closed. This will result in a degradation of medical practice, a lessening of the requirements of medical education, the admission of a less satisfactory class of men into the profession, and a general loss of professional status. If the profession refuses as a whole to work the Act, the medical service of the Act will break down; if it agrees to work it, the medical profession will break down.*

---

*The Representative meeting of the British Medical Association held November 19th, instead of taking two days for discussion, voted in an hour or two by an overwhelming majority of delegates to refuse service under the Insurance Act. The refusal was determined as much by the intolerable subjection of the profession under the regulations issued by the Insurance Commissioners as on account of monetary terms, indeed, more so, for many felt that the remuneration was worth a trial at least, to be amended later, if inadequate—but nearly all felt that the requirements were too great, and above all that every vestige of independence and self-respect would be lost under the regulations.

Unfortunately, however, although the votes of the divisions for refusal were in a vast majority, the minorities in those divisions aggregate a considerable number, and I fear that Mr. Lloyd George will find quite a number to break away and accept work either in an attempt to form panels, the establishment of a wholetime service, or by special arrangement with the constituent societies under the Act, which will be a reversion to club practice pure and simple, and under even more unsatisfactory conditions than before, because there will be fewer candidates for the posts, consequently competition will be less keen.

The ultimate fate of the Act, however, I think is clear, whichever alternative the Government adopts. The men who will comply will for the most part—a few political partisans of Mr. Lloyd George apart, who would like to help him out—be inferior socially and professionally. The result will be that the Act will *not* have improved the medical treatment of the poor, under either the first or the third alternative. As to a wholetime service, it is frankly impossible as matters stand, if for no other reason, for financial reasons alone. It must be remembered that unlike club practice they will have to attend to the chronically diseased—for there are no picked lives, as in Clubs—to venereal, drunkenness, etc., to use all modern methods of diagnosis, treatment, and being 'State' doctors they will undoubtedly have everything possible exacted from them by patients.

At least 9,333 medical men (at 1,500 insured per man) would be required. The least that could be offered would be £ 500 *clear* each. Then there would be the cost of premises—first cost, upkeep, repairs—drugs, and surgical and medical appliances, transportation (motor cars, horses, etc., or fees for use of public conveyances) and a heap of other things. Therefore the expense for *medical working alone* would be 6 or 7 million pounds, for which there is no adequate provision.

Even if they try the wholetime system only in the large industrial centres, and one of the other two where practicable in other places, the unequal working of the Act will rouse loud and continued discontent and revolt among the public. These plans of the Government are based on the idea of starving out the needy members of the profession in industrial centres. The profession, however, may counter this by its vast and increasing sustentation fund. That remains to be seen.

THE PROGNOSIS OF CANCER OF THE VULVA.

By Fred J. Taussig, M. D., of St. Louis.

Ordinarily the more superficial the cancer, the better is its prognosis. In the female genital tract, however, the reverse is true. For whereas in cancer of the uterine body the percentage of cures is about 80 out of 100, that in cervical cancer is between 20 and 30 per cent., and the proportion of cures in cancer of the external genitals is only about 12 per cent. (the actual figures being 14 cures out of 114 cases).

It is not altogether easy to account for this high mortality. Partly it can be explained by the unusually high age of the patients, the average being between sixty and sixty-five. A certain percentage of these women succumb to intercurrent diseases before the five-year-period after operation has elapsed. A second factor in the small number of cures is the early metastasis to the tributary lymph-glands and the frequent location of the cancer near the urethra and the pubic arch. Even allowing for all this, however, the small percentage of cures must depend largely upon other factors.

Before considering them, let the writer review very briefly the history of 8 cases that have come under his care in the past five years, all but 2 of them having been in his service at the Barnard Free Skin and Cancer Hospital (St. Louis). When we consider the fact that only about 300 cases have been recorded in medical literature, these 8 cases represent an unusually extensive experience. As to location, 3 of the 8 were found upon the labia, 3 were confined to the urethra, and 2 involved both vulva and urethra.

Following is a brief abstract of the cases:—

Case I.—A woman, æt. thirty-seven, seen by the writer September 14th, 1907, showed upon the right labium majus an area of leucoplakia, about 2 in. in diameter, in the centre of which was a small nodular growth that bled readily and proved microscopically to be a carcinoma. The symptoms were severe itching and slight discharge. The patient refused operative treatment and did not return. No glands were palpably enlarged, and the case seemed very favorable for a complete cure.

Case II.—Mrs. M., æt. forty-five, was operated on by the writer in 1899 for retroverted uterus and relaxed pelvic floor. At that time he noted a caruncle of the urethra. Four years later, he saw the patient again and found a cancer at the orifice of the urethra, one inch in diameter. Her only symptom was a slight bloody discharge for the previous two months. Radical operation with removal of inguinal and femoral glands (Dr. Crossen). Nine months later recurrence in left deep inguinal glands. Secondary operation. X-ray treatment at the Barnard Hospital without relief. Death, one and a half years after beginning of disease from distant metastases. No local recurrence.

CASE III.—Advanced cases of carcinoma involving vulva, urethra, and part of vaginal wall, occurring in a woman sixty-five years of age, with chronic nephritis. To one side of the large ulcer could still be seen a strip of leucoplakia from which apparently the cancer had sprung. Symptoms extended back about two years. A physician saw her one year before she came to the Barnard Hospital, and told her she had a cancer. Inguinal glands enlarged. Palliative local operation with excision of ulcerated area. Death thirty-six hours later from shock associated with subcutaneous extravasation.

CASE IV.—Advanced case of urethral cancer involving clitoris and vestibulum vagina in a patient fifty-nine years old. Radical operation on April 4th, 1911. Local recurrence seven months later under left pubic arch involving periosteum. Severe pains at site of recurrence requiring morphine in large doses. Last December, the writer resected the left pudic nerve and did a palliative operation on

Carcinoma involving vulva and urethra (Case III), showing implantation metastasis in the incision made over left buttocks for resection of the pudic nerve.

the recurrent area. Since then there has been practically no more pain, although the local recurrence presents a large crater. Of further interest also is a small implantation metastasis in the incision made for the nerve resection. The history of the patient showed that at the very onset of her symptoms, six months previous to her coming to the writer's charge, she had consulted a physician who advised only local measures.

CASE V.—A woman, æt. seventy-one, poorly nourished, gave a history of irritation round the external genitals and a bloody discharge for longer than a year. Early in the disease she had been examined by a doctor who treated her locally. The writer found an ulcerated area, 2 in. in diameter, involving the tissues about the labia minora and clitoris; the inguinal glands on both sides were en-

larged and hard. Radical operation at Barnard Hospital, in May, 1911, starting with removal of tributary lymphatics in one piece on both sides, and ending with wide excision of the affected area on the genitals. The inguinal glands showed cancer metastases. Nine months later the patient entered the writer's service at the City Hospital with a recurrence locally, but no evidence of further lymphatic involvement. Secondary radical operation with removal of a small portion of the pubic periosteum. Three weeks after this secondary operation there developed necrosis of the symphisis pubis, followed by a sloughing away of a portion of the left pubic ramus. Death one month after operation.

Case VI.—An advanced case of carcinoma involving the inner surface of the right labium majus in a woman about sixty-five years old, seen only once, in 1909, at the Washington University Dispensary. She refused operation and disappeared from further observation.

Case VII.—In a patient, æt. fifty-nine, having an advanced cervical cancer there were found many condylomata acuminata round the external genitals. One of these at the meatus was unusually large, hard and bled easily. Local removal of this growth together with vaginal hysterectomy on June 19th, 1909. Microscopical examination of the urethral growth showed a beginning malignancy, possibly an implantation metastasis from the cervical cancer. The patient doubtless died from the cervical cancer before there was any time for local recurrence round the urethra.

Case VIII.—An early case of cancer of the urethra in a woman, æt. sixty, whose only symptoms were slight burning on urination and an occasional bloody discharge for several weeks. Examination revealed evidence of a chronic urethritis, and at the lower border of the meatus a small hard infiltration ½ in. in diameter, friable and bleeding readily on touching. A small excised piece showed a beginning squamous-celled carcinoma. On July 21st, 1910, excision of the entire urethra, labia minora and clitoris, together with the tributary inguinal and femoral glands on both sides. Up to the present time, almost two years since the primary operation, there has been no recurrence. The resultant urinary incontinence required three plastic operations before relief was obtained.

From the standpoint of etiology these cases are of considerable interest, inasmuch as four of them give direct evidence of a previous irritative process on the basis of which the carcinoma developed—twice a preceding leucoplakia, and twice a chronic urethritis. The average age of the patients was fifty-eight years.

Vulvar carcinoma usually starts as a small infiltration which rapidly ulcerates and then gradually extends into the surrounding tissues. Pruritus is the earliest and most marked symptom; later there is discharge and bleeding; and, in the advanced cases, pain due to involvement of the periosteum and nerve trunks becomes pronounced. As to treatment, the x-rays and radium have given practically no results. Surgical measures alone give hope of cure, but they must be employed at an early stage in a radical way. It is preferable to begin by an incision along Poupart's ligament with thorough dissection of the entire superficial inguinal and femoral lymphatics with their surrounding adipose tissue, followed by a wide excision of the external genitals. Care should be taken to prevent implantation metastases and infection of the wound, by keeping the ulcerated area covered during the operation. It will usually be necessary to

dissect off skin flaps from the thigh or abdomen in order to cover the denuded genitals. The operative mortality will depend primarily upon the general condition of the patients rather than upon the severity of the operation itself.

To conclude, therefore, we must acknowledge that at present the prognosis in vulvar carcinoma is bad, but we believe that it can be considerably improved so that almost one-half of the patients may be saved if only the public, the general practitioner, and, for that matter, the surgeons themselves would do their duty.

The public, that is to say, the women should be taught that itching and a watery discharge in old age may mean the beginning of malignant disease. From the histories of the writer's 8 cases, however, he is inclined to believe that the general practitioner is more often the delaying factor in proper treatment. At times, he simply prescribes a wash without making an examination; at times, he recognizes the cancer, but fails to realize the possibility of cure. The treatment of hypertrophied prostate in old men and of prolapse in old women has conclusively shown that age is absolutely no contraindication to operation. We believe, therefore, that early diagnosis followed by immediate radical operation will give distinctly promising results in this form of carcinoma.

ECZEMA AS SEEN BY THE GENERAL PRACTITIONER.

By A. Ravogli, M. D., of Cincinnati.

When a physician is called to see a case of skin affection, the most obvious diagnosis he makes is that of eczema. A dermatologist called to see a case of an affection of the skin with some inflammatory symptoms, exudation, vesicles, etc., will pronounce it eczema. It seems to the writer that eczema is to the dermatologist what rheumatism and dropsy are to the general practitioner. It is a group of symptoms which reveal an inflammatory affection of the skin. But so far a proper limitation and a true meaning of eczema have not yet been established. In a great many cases the diagnosis of eczema is made for the only reason that the eruption has some of the characteristics which are given in the description of this disease. In many cases it is a diagnosis of convenience, so as to satisfy the patient and also the physician.

We must say that eczema is an inflammation of the skin, and Hebra stated that it can be artificially produced. But we must not forget that we have a genuine inflammation of the skin which we call dermatitis. Therefore, we find it necessary to state that dermatitis is not eczema, but that eczema is dermatitis.

The writer is sure that this will appear as a somewhat paradoxical statement, but in a few words his idea will be clear. When we apply some croton oil to the skin, we see that the skin becomes red, inflamed, swollen, itches and burns, and by repeating the application we produce vesicles and papules; if the skin is kept clean, covered with sterilized gauze, it returns to its normal condition in a few days. We may see the same when the skin has been exposed to the direct action of the sun; when it is red, swollen and even blistered we have a form of dermatitis calorica, but no one would be correct in making a diagnosis of eczema.

In order to understand the writer's position as to eczema, a sharp line between dermatitis and eczema must be drawn, and then it will easily be seen that eczema is a dermatitis, but that dermatitis is not eczema. In a great many cases of acute eczema, and especially in those cases of recurrent eczema which Unna called nervous eczema, we can easily see that there is a great difference between eczema and dermatitis.

Dermatitis is quite often the beginning of an eczema, which, starting with acute symptoms, gradually assumes a type of chronicity, with repeated recurrences, and is an eczema. Willan and his followers, in their classical definitions of eczema, did not separate it from an inflammatory

process of the skin. They claimed eczema to be an eruption consisting of small non-contagious agglomerated vesicles, which, when their fluid contents were reabsorbed, were changed into thin scales or crusts. In this definition any eruption could find its place, either from internal or from external cause; and any traumatic dermatitis or herpetic eruption could be grouped together in the same way.

Rayer and the French School distinguished acute vesicular dermatitis from chronic vesicular eruptions, and this differentiation corresponds to the conception of our idea of eczema. Devergie was the first to show the greater frequency of eczema over the other affections. He rejected the idea of an eczematous dyscrasia, and considered the person subject to eczema as healthy, and only sick when afflicted with the eruption. Rayer opposed the idea of Willan that the presence of vesicles constituted eczema; he also opposed the ideas of Bazin and Hardy as regards arthritic and herpetic eczema.

A complete study of eczema was made by Hebra, who gave the most logical and perfect description of the disease. He denied any dyscrasia to be the cause, and showed that any external irritation could produce the disease. His experiment with croton oil, although not clearly differentiating dermatitis from eczema, was very suggestive in establishing its varieties: erythematous, papular, vesicular, pustular, squamous, and weeping. These clinical forms are still maintained by the dermatologists as a guide in the diagnosis and in the selection of the method of treatment. According to Hebra the affection begins in an acute form, which gradually changes into a chronic eczema. It is only in peculiar states of the organism that chemical and physical causes produce eczema; also menstruation, pregnancy, lactation, chlorosis, etc., may be predisposing factors. Hebra's doctrines taught that dermatitis of different varieties entered into the group of eczema, and that impetigo disappeared as it became an eczema impetiginosum.

The most important characteristic of eczema is not the presence of vesicles, as was maintained by Willan, but the character of chronicity pointed out by Rayer, who described eczema in the different regions of the body, and drew a sharp line between eczema and all the forms of dermatitis that had been considered acute eczema.

The presence of one symptom alone does not constitute the character of eczema, but the diagnosis should follow the grouping of all the symptoms together, thus giving the ensemble of eczema. Redness of the skin, vesicles, oozing of serum, although symptoms of eczema, are, nevertheless, common to dermatitis calorica and any dermatitis venenata. Hebra insisted that the itching sensation was one of the most prominent symptoms of eczema.

M'Call Anderson established four pathological conditions as the principal features constituting eczema:—

1. Infiltration of the skin.

2. Exudation on the surface of the skin.
3. Formations of crusts.
4. Burning and itching sensation.

The infiltration is certainly the characteristic lesion of eczema, and from the infiltration the other manifestations proceed. Papules, vesicles, oozing of serum in eczema rubrum are the result of a varying degree in the exudation and infiltration. The prevalence of these lesions indicates the adjective which should be used in describing any variety of eczema: erythematous, papular, vesicular, or weeping.

Chronicity, which is dwelt upon as the characteristic sign of eczema, must be carefully considered, since we see many cases occurring suddenly in an acute form, and the existence of acute eczema is undeniable. We must agree with the views of Unna,[1] that if the acute traumatic dermatitis of Willan could be included in the eczema of Rayer, then the relationship between artificial dermatitis and eczema could be scientifically established.

The writer still adheres to the clinical conception of eczema—a position he has maintained for many years. Eczema is an acute or chronic inflammatory process, revealed by hyperemia, infiltration or exudation, affecting the papillary layer of the derma, showing redness, swelling, papules, vesicles, or a red surface deprived of the epidermis, oozing serum with formation of crusts or scales, accompanied with itching and burning sensation. This is a short description which can pass for a definition.

But if we wish to give a definition derived from the true essence of the disease, then we must consider first its possible causation.

Etiology.—It was difficult to arrive at a conclusion when the term eczema included sunburn, dermatitis from mercurial ointments or from handling cement (Willan); and when the dominant idea was the internal origin of eczema—the arthritism of Bazin and the herpetism of Hardy. Although Hebra maintained the cause of eczema to be of external origin, yet he found that the internal organs and the general condition of nutrition had a great influence in the production of the disease. The nervous system was found also to have some possible influence in the production of nervous eczema, a variety of which Bulkley was a strong supporter, followed by Brocq and Kaposi who called attention to reflex eczema.

Numbers of physicians consider dietetic errors as an important cause in the production of eczema. The selection of the food, the digestion, the assimilation, the metabolism, the excretions, and principally the toxic elements formed on account of bad digestion are considered important causes of eczema. Indeed, quite often eczema is associated with dyspepsia, gastro-intestinal catarrh, constipation, etc.; and secondary products such as uric acid, creatine, xanthin, etc., brought to the skin by the circulation, cause irritation and eczema. The theory sounds good,

very plausible, and consequently the patients are forbidden articles of food which are considered indigestible or doubtful—all spices, sauces, cheeses; only a milk diet is allowed. A patient who consulted the writer for a recurrent eczema had been restricted for six months to some kind of malted milk, yet the eczema kept on in a florid condition.

In 1890, before the British Medical Association in Birmingham, Unna expounded the parasitic theory of eczema, and showed that there was an external cause, which was a living micro-organism affecting the skin. He concluded, after many observations and cultures, that a special parasite, which he called 'morococcus,' was the cause of the disease. In 1893, in Washington, the writer read a paper before the Pan-American Medical Congress,[2] in which he referred to some experiments which he had made with the staphylococci, producing, artificially, eczematous eruptions in rabbits. He has constantly found staphylococci of two kinds, albus and aureus, in eczema. The ears of some rabbits, after having been shaved, were painted repeatedly with croton oil until vesication was obtained. One ear was left for control, and the other ear was inoculated with cultures of staphylococci. The ear, not inoculated, healed up in three or four days, while in two instances the ears which had been inoculated with staphylococci appeared inflamed and covered with crusts, and took between ten and fifteen days to heal. Reference was also made to clinical observations of eczematous eruptions on the skin which had been exposed to the action of pus, as in the vicinity of chronic abscesses, fistulæ, and often round the genitalia in the female when affected with purulent discharges from the vagina.

The parasitic origin of eczema has been maintained by Toerock, Jadassohn, Galloway, Sabouraud, and many others. The writer is so firm a believer in the origin of eczema from the staphylococci that he would not hesitate to accept the following as a definition of eczema: A catarrhal inflammation of the skin, produced by the vegetation of the staphylococci in the epidermic layer and in the superficial papillary layer. This definition should make us understand the difference between dermatitis and the vesicular eczema of Rayer; hence, the writer is in full agreement with Unna, that eczema begins where the artificial dermatitis ceases. In other words, the sun-rays, poisonous sumac, or any medicinal agent will produce a dermatitis which remains a dermatitis for a certain time; but when the staphylococci begin to vegetate on the macerated epidermis, and small vesicles are formed, and when the characteristic slow course is noted, then an eczema has begun. But it would be erroneous to believe that eczema always begins with dermatitis; for, in a great many instances, it begins as eczema, and undoubtedly as an acute eczema. The conception of an acute eczema cannot be denied, unless we ignore and overlook the characteristics of many cases which come under our observation.

The staphylococcus producing eczema is generally of the albus variety, and shows neither a highly infectious character nor any contagiousness,

It has occurred but seldom that a babe has communicated eczema to the mother's breast. Cases in which eczema has been communicated from one to another may occur, but in general they are rare. The infectiousness is only individual, local and limited. In eczema there is no symmetry, the patches show irregularly on both sides of the body, since they are the result of inoculation or arise from the affected skin being contiguous to the healthy skin.

After traumatic or chemical lesions of the epidermis, an eczema may occur, as is often seen from the scratching in scabies and leg ulcers. The auto-inoculability of eczema is quite clear in those instances where it is transferred from one part of the body to another. The finger-nails filled with epidermic scales and pus-producing germs, when scratching, carry eczema to other parts of the skin. Where two surfaces of the skin are in contact, as in the fossa crurogenitalis, the perianal regions are more liable to be affected with eczema on account of the maceration of the epidermis. In these cases the affection starts as an intertrigo, which by the development of the staphylococci is soon changed into eczema. Stubborn cases of eczema are seen around the finger-nails, because the epidermic folds containing the nail offer a good abode for the germs. Staphylococci make their way into the follicles of the hair, causing eczema pilaris, and when going beyond the funnel to the hair follicle cause folliculitis (sycosis). They invade the openings of the sweat glands; they make their way into the pores of the skin, through the furrows of the epidermis, where they remain unmolested. When the eczema improves, the epidermis gradually reforms; but all of a sudden a relapse occurs, which is due to the pathological action of the germs concealed in the pores of the skin. Very frequently we see patients who, suffering from eczema, are affected with furuncles scattered in different parts of the body. These furuncles are the result of the infection carried into the follicles, and then transmitted from the sac of the follicle to the connective-tissue. They are due to the same staphylococci, and more particularly to the aureus, a species which is much more virulent than the albus.

The ubiquitous staphylococcus, growing to immense quantities on the eczematous surfaces, may be carried into the circulation, and undoubtedly has a noxious influence on the general system, causing systemic disorders which maintain the chronicity of the eczema and the tendency to relapse. In these cases, a lack of resistance in the skin is responsible, a condition which is so well described by the name of 'anaphylaxis.' Thus the system being unfit to act as a protection against these parasites, the consequence is that any slight irritation of the skin will reproduce the disease.

Weidenfeld, experimenting with eczematous patients, tested the reaction of their skin to the effects of croton oil. He found that the strongest reaction was obtained in those affected with the acute variety, or

in those subject to the acute recurrent form. A weak reaction was seen in those affected with chronic eczema. Moreover, the reaction was greater in cases of diffused eczema, and more accentuated near the eruptive patch than at a distance. According to all his experiments, it appears that the skin of different persons reacts in different ways to croton oil, dependent upon the normal state of the skin; and that in those who have or have had acute eczema, the skin reacts to a great degree, but in chronic eczema of long standing, little or no reaction is found. It appears that croton oil has no peculiar action on the blood-vessels nor on the tissues, but rather affects the serum of the blood, similar to the production of an emulsion of the oil; and this is more apparent in patients suffering from chronic eczema than in those with acute eczema, or in good health.

The inflamed patch produced by croton oil heals up in a few days, but at its site an inflammatory process begins, which is perfectly identical with eczema. Besnier's idea of eczematization is excellent and explains the production of an eczema following any traumatic irritation.

In the opinion of Weidenfeld the recurrence of eczema is due to some kind of toxic substance formed in the system and carried to the skin, thereby increasing its irritability. The skin of those who have suffered from eczema retains a certain degree of irritability, and as a consequence any irritation is capable of bringing on another attack of eczema. It appears that the irritability of the skin remains persistent after eczema, as the result of the absorption of toxic elements from the skin.

Eczema usually begins in one place, as a primary localization, and then is followed by eczematous eruptions on other parts of the body. The primary eruption is always from trauma or from chemical irritation, as illustrated in eczema of the hands, in the direct action of the sun on the face, in the rubbing of the clothes on the scrotum and genitals, in the hyperhydrosis of the feet. Following the primary eruption, eczema may appear in other parts of the skin; and this is called secondary eczema. Kreibich states that the secondary eczematous eruptions are caused by the primary eczema acting as an irritant on the vasomotor system; and that every traumatic influence will react and reproduce eczema.

The itching sensation of eczema, which patients attempt to relieve by scratching with the finger-nails, may be the cause of spreading the eruption from the primary eruptive places to other parts of the skin. Indeed, Hebra, Kaposi, Riehl, Kreibich, Pusey and many others maintain that the spreading of eczema is due to the scratching. In fact, we often see a localized eczema ani, which is started and maintained by the continuous scratching from pruritus.

The skin of those who have suffered from eczema, as well as the blood-vessels and the blood itself, must have undergone some changes, otherwise we could not explain the tendency of the eczematous to recurrent attacks. Weidenfeld finds, as an argument against the bacterial

origin of eczema, the difference in its clinical forms. The writer, on the contrary, is of the opinion that the difference in the form of eczema is easily explained by the degree of the inflammatory process, and by the power of resistance peculiar to the different regions of the skin. In the same patient, at the same time, we see different forms of eczema, according to the parts of the body affected. In the same patient we may see an erythematous eczema on the face and neck, the papular form on the shoulders and chest, eczema rubrum with abundant exudation on the legs, while on the hands and fingers squamous eczema with painful rhagades may be present. That irritation predisposes the skin to eczema is beyond a doubt; but, though this is undeniable, there must be a condition in the system which causes reaction, and allows the pus-producing germs to show their injurious action.

Indeed, in some cases of senile pruritus the skin may be scratched without showing any pathological lesion of eczema. Any other disease of the skin is liable to predispose it to eczema, and quite often eczema is a manifestation secondary to some other lesion. We see stubborn cases of eczema, which are the result of irritation from continuous scratching in prurigo, lichen planus, or herpes tonsurans. Toxic substances producing toxic dermatitis make the skin liable to eczema. In his hospital service the writer once had an orderly, who developed a very violent dermatitis affecting the hands, arms, neck and face from preparing iodoform gauze. The dermatitis of the face, neck and arms healed within a week, but the vesicular eczematous eruption, of relapsing type, on the hands and the forearms, lasted for over four weeks. To the same anaphylactic condition Weill[4] has attributed cases of eczema following the application of a ½ per cent. atropine salve. He remarked that a peculiar susceptibility to the atropine remained with the patient, and that sometimes but one drop of an atropine solution or rubbing the arms with a ½ per cent. salve would cause the return of eczema.

The seborrheic condition of the skin, so often prevalent in children, may cause eczema. Under the dry masses of greasy matter on the scalp, the epidermis is easily macerated, irritated, and the staphylococci find a good ground for their development. In infants the eczema often begins on the scalp, and then spreads to the face in the form which is called 'crusta lactea.'

The spreading of eczema decidedly shows its bacterial origin, and that the toxic elements, which are formed in the skin, are carried into the circulation. The serum of the blood is able to produce antibodies for a certain length of time, but finally it is overcome by their presence; the albumin in the serum is diminished in quantity, consequently the organism is no longer protected. The condition called 'anaphylaxis' is present. For this reason, any little irritation is capable of reproducing eczema in the eczematous individual. The matter of general nutrition plays a

great rôle in the reproduction of eczema; since in anemic and badly nourished persons eczema and relapses occur more frequently.

Recalling what has been said, there are three factors which cause eczema: traumatic, chemical or physical irritation; the action of the staphylococci; the reactive property of the skin, which is connected with a peculiar condition of the organism, anaphylaxis.

The variety of eczema—erythematous, papular, vesicular, etc.—is only incidental, and is dependent upon the degree of inflammation and the sensibility of the skin.

Prognosis.—The general practitioner should not regard eczema as an incurable disease. Eczema is curable when it is properly treated. The idea of starving patients suffering from eczema is wrong. Many articles of food, such as cereals, fruits, legumes, are forbidden, for the reason that someone thought fit to interdict them without a scientific investigation. A patient with eczema should be fed well so as to increase the albumin in the serum in order that antibodies may be formed to oppose the toxic elements of the micro-organisms. On the other hand, we must persuade the patient to remove, from his diet, articles of food difficult to digest, capable of producing fermentation, and increasing the irritation of the skin.

Treatment.—The general practitioner should relinquish the false idea or the superstition that washing and cleansing an eczematous surface is injurious. Occasionally the writer has been consulted by eczematous patients, who presented lesions, dirty and covered with thick crusts. They excused themselves by saying that the doctor had forbidden them to wash or to use water in any way. Eczematous surfaces should be cleansed and kept as aseptic as possible, just as any other inflamed or suppurated surface. The purulent secretion remaining on the excoriated surface of the skin is exceedingly irritating and causes eczema to become more angry and to spread to the contiguous skin.

Internal specific treatment for eczema does not exist. The patient's condition, concerning his gastro-intestinal functions and general nutrition, should be thoroughly studied. If the patient is a dyspeptic, his digestion should be aided by alkaline mineral waters, or antidyspeptic remedies. If he suffer from constipation, saline waters, purgatives, etc. should be administered; and when the general nutrition is poor, ferruginous preparations should be the basis of treatment.

The recent introduction of the staphylococcic vaccine treatment, although greatly praised, has not yielded the writer good results; therefore, he cannot conscientiously recommend this treatment for eczema.

Local external treatment is the key to success. Acute eczema should be treated like any other dermatitis: applications of aluminum subacetate (2 per cent. solution) and dusting the surface with amylum powder. For vesicular eczema liniment with carbonate of zinc or ichthyol is very beneficial. In recurrent vesicular eczema, painting the surface with

tincture of iodine, as is done in surgical operations to sterilize the skin, and then covering with an oxide of zinc paste, has given very good results. Rhagades must be touched up with a 3 to 5 per cent. nitrate of silver solution.

Innumerable quantities of ointments, salves, gelatines, lotions are mentioned in the textbooks. The physician, however, should familiarize himself with the different preparations and their action in order to accomplish the cure of eczema.

BIBLIOGRAPHY.

1 Unna: Handbuch der Hautkrankheiten, Bd. II, p. 200.

2 Ravogli: Concerning the Etiology of Eczema. (*Medical News*, January 13th, 1894.)

3 Weidenfeld: Contributions to the Pathogenesis of Eczema. (*Archiv. fuer Derm. und Syphilis*, Bd. CXI, Hft. 3, p. 891.)

4 Weill (*Klin. Monatsbl. fuer Augenheilkunde*. Vol. 50, p. 458, April, 1912.)

BACKWARD DISLOCATION OF FEMUR WITH EVERSION.

By Norman B. Carson, M. D., of St. Louis.

The writer reports this case on account of its rarity, thinking that for this reason it may prove interesting.

Of such a condition as this Allis* says: "In this variety of dislocation the foot is everted, while the head of the femur lies outward upon the dorsum of the ilium. This form of luxation of the head of the femur may be primary or secondary. By primary I mean that the head of the bone escapes from the socket while the femur is in a condition of external rotation, and the dislocation occurs with all the signs of dorsal dislocation reversed. In this dislocation both the femur and foot will be turned outward, and the great trochanter instead of being on a higher level than the dislocated head, will be at a lower level, when the patient is in the supine position."

Allis then proceeds to report a case of this rare form of dorsal dislocation of the head of the femur that had come under his care and the method that he had adopted to reduce it. He further says that experimental work has demonstrated the possibility of primarily everted dorsal dislocations; and then goes on to describe the method of producing these dislocations on the cadaver, and says that he has repeatedly produced the luxation by this manipulation, but that he has quite as often fractured the femur in the undertaking.

Some years ago the writer had the opportunity of witnessing a very interesting and, at the same time, instructive demonstration by Dr. Allis, of the methods of producing the different forms of dislocations on the cadaver, before the American Surgical Association, but he has forgotten whether or not there was at that time demonstrated this particular form of dislocation.

Allis also says that the secondary variety may be produced through unspent forces converting a primary dorsal with inversion into a dorsal with eversion, or, as is not uncommonly the case, it may result from unsuccessful attempts at reduction by means of manipulation with circumduction; and he says that this method has not infrequently converted a dorsal with inversion into a dorsal with eversion.

In referring to the case reported by Dr. Roberts, he said that the attempts made, to restore motion to a joint stiffened by chronic synovitis, had resulted in a rupture of the capsule which, already softened and weakened by inflammatory processes, gave way; dislocation took place, and

*Trans. Amer. Surg. Assoc., 1911.

in attempting to restore it, the condition shown in the *x*-ray picture was produced.

January 8th, the writer found in his service at the Saint Louis Mullanphy Hospital, Mrs. A. K., white, German, *æt.* eighty years. This patient was thin, wrinkled, and with little or no adipose tissue, showing decidedly the evidences of age. She stated that the day before she had slipped and fallen, and in her attempt to save herself had injured her left wrist, and in the fall, had injured the left hip. On examination the injury to the wrist was found to be a fracture of the lower end of the radius about ¾ in. above the joint, and impacted with little deformity. On exposing the limb we found the thigh and foot everted with the
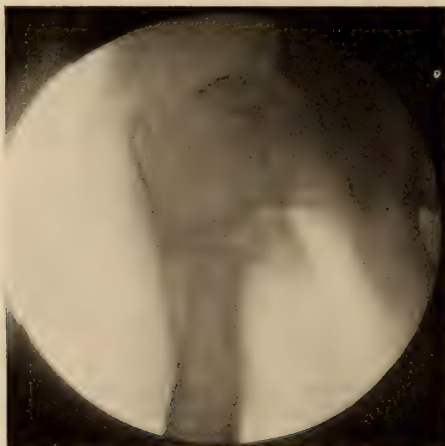
Intertrochanteric Fracture.

femur slightly abducted, and the heel resting just above the right internal malleolus. Attempts to manipulate the limb proved it fixed, with little or no motion, and very painful. In viewing the limb we thought we had a fracture of the neck of the femur before us, but when we tried to move it and found it rigid, we were led to doubt our diagnosis. An examination of the hip revealed the following conditions. Nelaton's and Bryant's lines showed the great trochanter to be ¾ in. above the former, and the same distance nearer the latter than it should be. The patient being so thin, it was easy to locate the head of the femur upon the dorsum of the ilium, with the great trochanter on a line lower than the head of the bone, and behind and slightly above the acetabulum. As nearly as we could

determine by measurements, the limb was shortened about an inch and a half. As the roentgenologist was absent, and the suffering of the patient too great to permit of delay, we unfortunately did not get an x-ray picture. As the writer had never seen a dislocation backwards with eversion, he at first thought that there was a fracture-dislocation with impaction, especially as he could not make out a fracture of the rim of the acetabulum. This examination was made with the patient completely anesthetized. With the pelvis fixed firmly to the floor by a strong assistant, the thigh was flexed at a right angle to the body; and with the leg at a right angle to the thigh, the head of the bone was lifted up by another assistant until it was opposite to the acetabulum, while the writer manipulated the head of the bone. Just as it came up to the acetabulum and just as the assistant started to turn the knee in towards the umbilicus, and before any force was applied, the writer felt the head of the femur slip into place with a snap, indicating plainly that while we had succeeded in reducing the dislocation, we had at the same time produced a fracture. Buck's extension, with about 12 lb. of weight, was applied. The patient made an uneventful recovery, and was out of bed on February 23rd, and now, March 23rd, she can, with the aid of a nurse, and on crutches, walk around the ward, putting considerable weight on the injured limb. Measurements show only about $\frac{3}{4}$ in. shortening.

The x-ray picture taken March 25th shows the fracture to have commenced in the shaft of the femur below the lesser trochanter, and to have extended upwards spirally through the greater trochanter, and through the neck of the femur nearly to the head of the bone. The upper fragment has evidently slipped in towards the head of the bone, so that part of the greater trochanter shows above the neck.

The only way to account for this condition is on the supposition that the fracture started and was not completed before the dislocation occurred; and that when the head tore through the ligaments, the strain on the bone being thus relieved, the fracture was arrested before it was complete, but when the head slipped into the acetabulum, as the reduction was made, the fracture was completed.

It is impossible to explain the direction of the force applied that would, in this particular case, in a woman eighty years old, result in a dislocation, where we would naturally expect a fracture, especially as the bones were very brittle as was proved by the fracturing of the bone during the attempt at reduction of the dislocation.

The writer thinks the dislocation must have occurred before the patient reached the ground in the fall, and was caused by some peculiar twist of the limb as she began to fall, when the ligaments being attenuated by age, tore and allowed the head of the bone to escape from its socket before the patient reached the ground, and she thus escaped a fracture from the impact. Had the bone remained in place, a fracture would certainly have resulted.

Roberts thinks that it is generally believed that leverage during flexion of the hip is the usual mechanism of luxations of the head of the femur, and that the head probably escapes always downwards by a bursting of the joint capsule, by means of pressure against the internal surface, and that the head of the bone may finally come to rest at any point around the socket, the position it assumes depending altogether upon the amount of injury done the capsule.

The writer is aware that the value of this case is materially lessened by the fact that he was unable to get an x-ray picture before the reduction of the dislocation was accomplished, but the clinical picture was so complete and perfect that he has no doubt as to its nature, and therefore feels justified in reporting the case.

MEDICAL AND SURGICAL PROGRESS.

FISCHER'S THEORY OF EDEMA.

A REVIEW OF RECENT LITERATURE.

By Jerome E. Cook, M. D., of St. Louis.

1. Ostwald: The Influence of Acids and Alkalies on the Swelling of Gelatine. (*Pflueger's Archiv,* Vol. 108, p. 563.)
2. Loeb: Researches in Ionic Concentration. The Swelling of Muscles in Acid and Alkaline Solution. (*Pflueger's Archiv,* Vol. 69, p. 1.)
3. Fischer-Moore: On the Swelling of Fibrin. (*Amer. Journ. of Physiology,* Vol. 20, p. 330.)
4. Fischer: Further Researches on the Swelling of Fibrin. (*Pflueger's Archiv,* Vol. 125, p. 99.)
5. Fischer: The Nature and Cause of Edema. (*Journ. Amer. Med. Assoc.,* Vol. 51, p. 830.)
6. Fischer: The Nature of Glaucoma. (*Pfleuger's Archiv,* Vol. 125, p. 396, and Vol. 127, p. 1.)
7. Fischer: The Analogy between Water Absorption by Fibrin and Muscle. (*Pflueger's Archiv,* Vol. 124, p. 69.)
8. Hœber: Physikalische Chemie der Zelle und der Gewebe. Leipzig, 1911.
9. Thomas: Relief of Glaucoma by Subconjunctival Sodium Citrate Injections. (*California State Journ. Med.,* March, 1911.)
10. Moore: Fischer's Theory of Edema and Nephritis. (*Journ. Amer. Med. Assoc.,* Vol. 59, p. 423.)
11. Fischer: A Further Response to Some Criticisms of the Colloid Chemical Theory of Water Absorption by Protoplasm. (*Journ. Amer. Med. Assoc.,* Vol. 59, p. 1429.)
12. Fischer: Edema. New York: John Wiley and Sons. 1910.

To obtain a clear idea of the rather startling theory of edema and the equally startling conclusions to which it leads, it is necessary to review the work of Fischer in its gradual development. This work began with researches in the realm of physical chemistry and then extended into the field of clinical pathology. It is an attempt to explain, on a physico-chemical basis, the phenomenon of edema and other supposedly related phenomena of the excretion and retention of water in the animal organism, or in its several parts. In doing this it relies chiefly upon the apparently identical behavior, within the living organism and in the test-tube, of that class of organic chemical bodies known as colloids. The

work of Fischer upon the properties of colloids was suggested by that of Spiro, Ostwald and others, in regard to the hydrophilic or water-absorbing properties of colloids, gelatine in particular. Fischer began his investigations with another colloid—fibrin—and found that this substance behaved in all essentials similarly to gelatine, the difference being rather of degree than of kind. Since these experiments are the foundation of Fischer's theory in general, it is necessary that they be briefly described and the conclusions reached be stated.

If definitely weighed amounts (.25 grm.) of ordinary blood fibrin, freed from salts, are introduced into definite volumes (25 c.cm.) of various solutions contained in test-tubes of the same diameter, the fibrin swells to very different heights. The solutions employed were weak dilutions (n/10-n/250) of various acids, alkalies and salts, and weak dilutions of acids and alkalies to which various salts had been added. For our purpose the results of this investigation may be summed up as follow:—

1. Fibrin swells more in acids than in distilled water, but the swelling is greater in one acid than in another of equinormal dilution.

2. The degree of swelling depends on the acid concentration, being greater (within certain limits) the higher the concentration.

3. Addition of any salt—electrolyte—(non-electrolytes have no appreciable influence) to an acid solution diminishes the ability of fibrin to swell, and the stronger the salt concentration the less will the fibrin swell.

4. These various phenomena are for the most part reversible; for example, fibrin which has absorbed a certain amount of water in an acid solution of given concentration will give up amounts of that water in proportion as salts are added to the solution. The effect of one salt is greater than that of another of equinormal concentration.

If muscle tissue be substituted for the fibrin (Fischer used the gastrocnemii of frogs and toads) the same conclusions in all essential details are found to be true. The same is true of extirpated sheep eyes, the increase in tension due to water absorption being sufficient, in some experiments, to burst the sclera. "This extensive analogy between the absorption of water by fibrin or gelatine and the absorption of water by muscle," says Fischer, "seems to me to justify the conclusion that the absorption of water by muscle is determined in the main by the state of colloids contained in the muscle."

And here we have the key to all of Fischer's ideas on edema and what he conceives to be its related phenomena. Osmotic pressure and the theory of cell membranes are thrown aside. "A state of edema is induced whenever, in the presence of an adequate supply of water, the affinity of the colloids of the tissue for water is increased above that which we are pleased to call normal." This increased affinity is brought about mainly by an accumulation of acids (i. e., hydrogen ions) in the tissues, whether by increased production, inadequate removal, or both. And without entering into the investigations cited by Fischer in support of this contention, we may say that he conceives increased acid production to take place under several circumstances: (1) whenever, through any cause (anemia, passive congestion, etc.), there is insufficient oxygen supply to a part; (2) in various states of inanition; (3) in fever; (4) in nephritis. On the other hand, a diminished affinity for water, resulting in a loss of water and decrease in size of the organ or tissue, is brought about in vivo by the same agency as in the fibrin and muscle experiments, i. e., by an increase in the dissociable salts. Therefore, reasons Fischer, whenever, for some cause, a condition of increased affinity for water

exists in a tissue (edema), this increased affinity may be counterbalanced by increasing the amount of salts present. This is the basis of his therapeutic recommendations. Glaucoma, says Fischer, may be taken as an example of a local edema. Why does the eye hold an increased amount of fluid causing increased tension? Not because the 'filtration angle' is blocked, nor for any other of the reasons previously advanced, but because, for some reason not yet determined, chemical changes occur in the eye which increase the affinity of the eye colloids for water. The injection of a salt to decrease this affinity is the logical therapeutic manoeuver. This has actually been tried in glaucoma by Fischer and others with encouraging results. The salt selected was a 4-5 per cent. solution of sodium citrate, 15 m. being injected subconjunctivally. The effect of the injection is a prompt reduction of tension which lasts for a week or more. A similar treatment is recommended for nephritis. Here the kidney cells, with an increased affinity for water, due to toxin or circulatory change, become swollen, sometimes so extremely that all urine excretion ceases. Increasing, by subcutaneous injection, the amount of salts in the blood reduces the swelling of the kidney parenchyma and reestablishes its excretion. The reviewer has as yet seen no report that this suggestion, so contrary to the accepted procedure, has been adopted.

Certain criticisms have been made of Fischer's theory, but too little time has elapsed since its postulation to warrant conclusions. Certainly, the question cannot be flippantly discussed or tossed about, and a decisive disproval of the basic hypotheses of the theory will require much careful work. On the other hand, one must not be too hasty in assuming that favorable clinical results like those reported in glaucoma are of necessity a direct proof of the truth of the entire edema theory. Many elusive points must be investigated before the theory may be said to be either proved or disproved. In the meantime, if it shall lead us to really valuable therapeutic aids, the practitioner of medicine will gladly let the theorists wage as hot a battle as they like with whatever forces they can marshal.

ENTEROVESICAL FISTULÆ.

A REVIEW OF RECENT LITERATURE.

By John R. Caulk, M. D., of the Editorial Staff.

1. Gutzeit: Formation of Bladder Calculus after Cauterization of a Vesico-Vaginal Fistula with Lunar Caustic. (*Zeitschr. fuer Gyn. Urol.,* 1911.)
2. Pilcher: The Ileo- and Appendicovesical Fistulæ. (*Amer. Journ. of Urology,* July, 1912.)
3. Pristavesco: Contribution to the Study of Vesico-Intestinal Fistulæ. (*Journal D'Urologie,* September, 1912.)

Since the report of Pascal in 1900, the most complete work on the subject of enterovesical fistulæ has been presented by Pristavesco, who has studied the subject very thoroughly from every point of view.

Vesico-intestinal fistulæ were but little known in ancient times. The first authentic case was published in the fifteenth century. Most of the early cases were autopsy findings; and when the disease was diagnosed clinically, it was considered an incurable malady. In the nineteenth century, the first complete work was published by Blanquinque. Pascal found several references to this disease in ancient times, those of Praxagore and Schenckius in 1600. The latter's case was supposed to have been a carcinoma of the rectum which had ulcerated into the bladder.

Concerning the order of frequency of the various parts of the intestinal canal, which enter into the fistula formation, the vesicorectal is the most common; next, cecal and appendiceal, then the sigmoid; the latter, particularly, in connection with Meckel's diverticulum. The fistula may be due either to a simple inflammatory reaction, traumatism, tuberculosis, or cancer. The disease is more prevalent in men than in women. Pascal's statistics of 286 cases showed 75 per cent. in the male, due to the fact that the female genitals are interposed between the bladder and the rectum. Most of these fistulæ are traumatic, and are not only the direct result of a shot, puncture or stab, but occur from the passage of foreign bodies—pins, buttons, etc., which form a communication by the formation of an intermediary abscess. Surgical traumatisms have also caused numerous enterovesical fistulæ. These have recently been greatly curtailed, owing to improved surgical technique. The non-traumatic fistulæ come either from acute or chronic diseases. Among the most common are appendicitis, dysentery, chronic enteritis, typhoid, syphilis, chronic cystitis, and various parasitic diseases, chiefly actinomycosis.

There is another class of cases which was thought to be of unknown origin, but which recent investigators seem to think is due to Meckel's diverticulum. Recent cases have been reported by Pilcher, Pennington, Boehm and others. The symptoms of these fistulæ may be divided into those which precede the fistulæ and are dependent upon the diseases causing them, and the symptoms proper. The symptoms proper are classical,

and consist in modification of the urine, due to intestinal material passing in the bladder, passage of gas and fecal particles into the urine, and of urine per rectum. The patient may have marked intestinal disturbances, such as diarrhea, tenesmus, the passage of blood and pus per rectum; also symptoms of severe cystitis. Guyon states that cystitis is late in developing in spite of an infected urine. Ureteritus and pyelitis are also late. Diagnosis is usually easy, and is made, as a rule, from the symptoms, by cystoscopic examination, and by injection of dyes. A differential diagnosis must be made between pneumaturia, ureterorectal and uretero-intestinal fistulæ. With careful uranalysis and thorough examination of the rectum and bladder, these can generally be differentiated without difficulty. Pneumaturia occurs after passage of certain hollow instruments into the bladder, and as the result of diabetes and certain neuropathies. In arriving at the diagnosis of uretero-intestinal fistulæ, it should be remembered that the passage of gas and fecal material by the urethra is not present. An injection of colored liquids into the bladder and cystoscopic examination will clear up the diagnosis. The average life of patients, suffering with vesico-intestinal fistulæ untreated, is three years, according to Pascal. Spontaneous cures are rare. Traumatic fistulæ are the most benign, as they generally occur between healthy viscera. The prognosis of these fistulæ is much brighter than formerly, owing to surgical advances. The treatment may be classified as preventative, palliative, and curative. The first two are, as a rule, of little avail and were more employed in the older days of surgery. The curative treatment consists of the interruption of communication between the intestine and bladder. This may be done by the vaginal, vesicovaginal, perineal, rectal, sacral, transvesical, and peritoneal routes. Pristavesco recommends the transvesical most highly, and this seems generally to be the method to be chosen. In certain cases, however, the peritoneal route has to be chosen.

Pristavesco collected in his series 9 cases of rectovesical fistulæ, about equal in men and women. Eight were traumatic. Diagnosis in all these cases was easy; surgical treatment (curative) was employed five times. The hypogastric route was done in 2 cases with cures; the vaginorectal and perineal, each in one case. He collected 19 cases of colo- and sigmoidovesical: 17 in women and only 2 in men. The traumatic origin was noted in 17, and was due, in most cases, to difficult accouchments with forceps. In 2 cases, it was due to a pelvic inflammation or syphilis. Surgical (curative) treatment was employed in all the cases.

Laparotomy was done five times: four cures, one improvement; hypogastric, three times and two cures. One failure, due to the fact that two ureters were caught in the sutures. The vaginal route, 11 cases. Ten were plastics, suturing the fistula orifice of the intestine with the neck of the uterus after liberation of the vesico-intestinal adhesions and mobilization of the inferior segment of the uterus. All cured. There are in his list 8 cases of diverticulovesical fistulæ. Intestinal diverticula may be either congenital or acquired. The congenital are generally located in the lower ileum with a structure similar to that of the intestinal, except that it is thinner, owing to lack of musculature. They seldom cause trouble, but may be the seat of inflammations, cause adhesions to the bladder, and produce fistulæ. The acquired diverticula are most frequent in the sigmoid. They arise either between the two leaflets of the mesentery (Grassberger, Good) or outside it (Hausman, Thorel). These diverticula may also, on account of many causes, produce fistulæ. Heine

found 7 such cases. Billroth, in a period of sixteen years, observed only one case of diverticulovesical fistula; and in his work on 400 observations of vesico-intestinal fistulæ found only 8 cases of diverticulovesical, or 2 per cent.

The diagnosis in these cases is more difficult, particularly to determine the seat of the intestinal involvement. The prognosis is also grave.

Heine gives 25 per cent. cures by operation, and states that laparotomy is the only curative treatment.

Pristavesco reports 6 cases of appendicovesical fistulæ. Pilcher's cases can be added to this group. The etiology of these cases is generally appendicitis, occasionally actinomycosis. Appendicitis with abscess is the most frequent cause. The genesis of true appendicovesical fistulæ without abscess is not easy to explain. The symptoms of these fistulæ are similar to vesico-intestinal fistulæ, in general; for the most part, they are preceded by symptoms of appendicitis. The prognosis of these fistulæ is also serious. Spontaneous cures are rare. The treatment may be prophylactic. Early appendectomy is indicated in the chronic cases, and medical treatment may be preventative in cases where the fistula has not formed and as a palliative measure when it is formed; such as vesical lavage with antiseptics and bladder drainage. Person reports a cure by such measures. Surgical treatment consists, as a rule, in removal of the appendix, either with or without suturing the bladder. Appendicovesical fistulæ, complicating acute appendicitis, may be cured spontaneously, and surgical interference demands no haste.

DIAGNOSTIC AND THERAPEUTIC NOTES.

TABES TREATED WITH TUBERCULIN.—Friedlaender (*Muench. med. Wochenschr.*, No. 38, 1912). The writer reports 2 cases of tabes dorsalis treated by means of tuberculin injections. In both cases there was not only a subjective amelioration of the symptoms but an objective improvement as well, especially as regards the return of the pupillary and patellar reflexes. It is necessary to give the tuberculin in doses sufficient to produce fever, but the latter should not exceed 39° C. (102° F.). For this reason it is best to begin with small doses, e. g., ½ mgrm. in order to exclude a concomitant tuberculosis. The dose is then slowly raised to 0.1-0.3 grm. Patients with a poor state of nutrition or with chronic heart or kidney disease should not be subjected to the treatment.

HYPERTHYROIDISM IN PULMONARY TUBERCULOSIS. — Brandenstein (*Berl. klin. Wochenschr.*, No. 39, 1912). Out of one hundred consumptives (seventy women and thirty men), three men and three women presented the typical picture of Graves' disease. Less outspoken forms of exophthalmic goitre were observed in two men and seventeen women, all of whom were in the first or second stages of consumption. This noticeably frequent occurrence of hyperthyroidism in pulmonary tuberculosis may be most readily explained by assuming an influence upon the thyroid gland of the tuberculosis toxin, since similar observations have been made in diphtheria, syphilis and other infectious diseases. Hyperthyroidism occurs more frequently in early than in advanced tuberculosis, perhaps because in the latter condition a relative immunity to the toxin has been produced. Some cases of Graves' disease of obscure origin may perhaps have arisen as the result of a previous tuberculous infection.

THE MELTZER TREATMENT OF TETANUS.—Kocher (*Corresp.-Bl. fuer schweiz. Aerzte*, No. 26, 1912). The Meltzer treatment consists in the injection into the spinal canal, by means of lumbar puncture, of a solution of magnesium sulphate. Kocher reports 3 successive cases of moderately severe tetanus, in which good results were obtained. In all the cases, the convulsions, which had proved refractory to all other treatment, promptly subsided after the injection of the magnesium sulphate, and all 3 cases ended with recovery. In 2 of the cases, however, a deep coma supervened, with complete respiratory paralysis, although the heart continued to beat strongly. The patients were kept alive by means of artificial respiration, Meltzer's intratracheal oxygen insufflation being used while the lumbar canal was being washed out. The patients finally resumed breathing, and there were no permanently ill after-effects. In view of the desperate nature of the affection, this mode of treatment is

worth trying, but obviously only amid surroundings in which the necessary therapeutic measures are available. The writer considers the 25 per cent. solution recommended by Meltzer as far too strong and prefers a 10 to 15 per cent. solution. Of this, 5-7 c.cm. may be used. Special care is to be exercised in repeating the injection.

———

RIVALTA'S REACTION FOR PUS.—Merklen, Regnard and Bonvalet (*Gaz. des Hôp.*, No. 73, 1912). The test is performed as follows: A drop of the fluid to be investigated is allowed to fall into 50 c.cm. of distilled water to which one drop of dilute acetic acid has been added. If the fluid contains pus, a cloudy precipitate, which the authors compare to the smoke of a cigarette, forms; in the absence of pus, the fluid remains clear. The test is especially useful in distinguishing exudates from transudates and in determining whether the albumin in urine is due to pus or not. A pyuria, even of slight grade, will give a positive reaction, while a purely nephritic albuminuria will fail to do so.

The nature of the reaction is not quite clear but in all probability it is due to the alkali-albuminate and perhaps the nucleo-albumins present in pus.

———

SALVARSAN IN SCARLATINA.—Lenzmann (Society Proceedings in *Deutsch. med. Wochenschr.*, No. 39, 1912). At the recent meeting of German Naturalists and Physicians, Lenzmann reported his results in scarlet fever following the use of salvarsan. Infants received 0.1 grm., intravenously, while older children were given two or three times as much. In all the cases a rapid termination of the disease followed the injections, of which the patient usually received three or four. The necrotic tonsillar membrane quickly disappeared and the temperature showed a staircase drop. The first injection should be somewhat smaller than the others, as the rapid destruction of the infectious agent may flood the organism with its toxins. The severest cases do not yield to the treatment, but all others seem to be favorably modified.

In the discussion Schreiber reported similarly good results with neosalvarsan. The most striking feature is the rapid disappearance of the membrane in the throat.

———

TREATMENT OF BRONCHIAL ASTHMA.—Meyer (*Deutsch. med. Wochenschr.*, No. 38, 1912). The best means of aborting the attack of asthma is the hypodermic injection of ½-1 c.cm. of a 1-1000 solution of adrenalin or suprarenaden. The treatment is based upon the experimental investigations of Pollack and Januschke, who showed that adrenalin dilated the contracted bronchioles. Adrenalin, for this purpose, seems to be superior to atropine. In the interval, one of the theobromin preparations, such as diuretin, is often useful. In many cases, an attack of asthma may be prevented, if the drug is given in a dose of 1 or 2 grm., a few hours before the attack is expected, for instance on retiring. It may be taken for weeks without ill effects. Neither were unfavorable results ever seen to follow the adrenalin injections, not even in cases of hypertension or of arteriosclerosis. During the interval between attacks calcium chloride, in large doses, should be given.

SOCIETY PROCEEDINGS.

ST. LOUIS MEDICAL SCIENCE CLUB.

The November meeting of the St. Louis Medical Science Club was held at the Barnard Free Skin and Cancer Hospital, Tuesday evening, November 12th, at 8:15 p. m. The following was the program of the evening:—

1. The Cubical Capacity and Superficial Area of the Sphenoid, Maxillary and Frontal Sinuses (with demonstration).
   ....Hanau W. Loeb
2. (a) Experimenal Studies on the Significance of Negri Bodies (with demonstration).
   (b) The Production of Antirabic Immunity by Intraspinal Injections of Virus............................D. L. Harris
3. The Suppression of Cardiac Fibrillation by Section. (Preliminary Communication.)............................W. E. Garrey

(Signed)   W. E. GARREY, *Secretary*.

THE CUBICAL CAPACITY AND SUPERFICIAL AREA OF THE SPHENOID, MAXILLARY AND FRONTAL SINUSES.

By HANAU W. LOEB, M. D., of St. Louis.

This work followed a study of the anatomy of the accessory sinuses of the nose from the standpoint of their greatest diameters, anteroposterior, supero-inferior and lateral. It is based on a method which was described before the Third International Congress of Rhino-Laryngology, at Berlin, 1911.

At that meeting, I showed how a complete plaster cast of a sinus could be made by uniting plaster moulds of those portions of a given sinus lying adjacent to one another in serial sections of the head.

These portions can be readily removed without injury to the specimen, affording a great advantage over the old method of making a cast with Wood's metal, which necessitates the destruction of the specimen before the removal of the cast. The cubical capacity is easily ascertained by the old method of determining the amount of water displaced by the cast.

The superficial area presents a much more difficult problem. After many experiments a plan was finally devised which was considered sufficiently accurate to justify its adoption.

The cast is covered with strips taken from a known quantity of adhesive plaster, fitted accurately without stretching. Subtracting the amount remaining from the known quantity gives the superficial area of the sinus in question.

The results of the study of the sphenoid sinus (except four which are added) were presented by me, with the methods, at the Congress; those of the maxillary are from studies by Dr. Virgil Loeb and of the frontal by Dr. Albert Miller.

Sphenoid Sinus.

The variation in form is exceedingly marked, in fact it may be said that there is no typical shape.

In all the specimens, the inner wall is almost uniformly smooth and free from prolongations, while the other walls may be exceedingly irregular. They exhibit projections externally, anteriorly, posteriorly and even inferiorly.

I have already called attention to the extreme variation both in size and shape in the sphenoid sinuses of various heads, as well as in individual pairs. Why there should be this great difference at the very centre of the skull is a problem still to be solved.

The cubical capacity of the sphenoid sinuses examined is as follows:—

Head	Right c.cm.	Left c.cm.
III	3.5	1.0
VII	6.5	9.9
VIII	3.8	3.0
IX	2.4	2.3
XI	4.0	4.5
XII	0.6	7.5
XIV	6.3	1.0
XXI	8.0	2.9
XXIII	3.0	3.1
XXVI	11.8	1.9
XXVII	4.8	8.2
XXXV	8.3	10.0
Average	5.25	4.61

Average of all the sinuses 4.93. Extremes: Head XII, right 0.6, and head XXVI, right 11.8.

These differ but little from the average of the ten heads previously presented, and still show that however much the sphenoids differ from one another in size and form, the averages of those of each side remain about the same, approximately 5 c.cm.

The superficial area of the sinuses is as follows:—

Head	Right sq. cm.	Left sq. cm.
III	16.0	5.6
VII	26.7	27.2
VIII	13.9	12.9
IX	8.9	9.7
XI	13.2	16.5
XII	2.4	22.7
XIV	24.7	4.6
XXI	18.3	10.8
XXIII	10.5	12.2
XXVI	26.4	7.4
XXVII	17.3	21.8
XXXV	25.5	28.2
Average	16.99	14.92

Average of all the sinuses 15.92.

According to the observation thus far made, the superficial area of the right sphenoid sinus is a trifle greater on the average, than that of the left side. It must be admitted, however, that there is a great difference in the two extremes—head XII, right 2.4, and head XXXV, left 28.2.

Maxillary Sinus.

The maxillary sinuses, as shown by the casts, are roughly triangular in shape, with the apex posterior, and with all the walls practically triangular except the internal, which is more or less quadrilateral.

The following indicates the cubical capacity of the 42 examined:—

Head	Right c.cm.	Left c.cm.
III	8.0	7.5
IV	24.8	24.5
V	24.5	19.2
VI	16.8	13.0
VII	13.9	14.5
VIII	7.0	4.9
X	10.2	10.0
XI	14.5	15.2
XII	10.0	7.2
XIV	13.0	14.8
XV	13.0	9.6
XVI	4.5	4.8
XVII	12.0	8.0
XVIII	11.5	4.8
XIX	12.5	18.5
XX	14.9	15.2
XXII	14.7	8.5
XXVIII	11.0	9.0
XXIX	8.8	7.5
XXV	18.3	15.0
XXXI	9.5	6.2
Average	13.02	12.85

While the extremes are head XVI, right 4.5, and head IV, right 24.8, the average for the right is very near that of the left.

The superficial area of the sinuses is as follows:—

Head	Right sq. cm.	Left sq. cm.
III	25.9	25.2
IV	52.3	48.4
V	51.3	45.8
VI	43.1	37.0
VII	34.2	37.7
VIII	27.7	21.2
X	29.0	29.7
XI	35.1	39.9
XII	28.3	22.4
XIV	35.2	35.0
XV	33.1	28.6
XVI	12.1	16.3
XVII	30.0	25.0
XVIII	34.2	16.5
XIX	31.0	40.0
XX	33.1	33.1
XXII	36.9	27.3
XXVIII	29.1	26.3
XXIX	25.9	25.9
XXX	41.4	38.1
XXXI	27.4	21.0
Average	32.91	30.43

General average of all the sinuses is 31.68, showing a marked uniformity in the two sides.

The extremes are head XVI, right 12.1, and head IV, right 52.3.

Frontal Sinus.

The casts of the frontal sinus show the significance of Hajek's division of the varieties into first, second and third degrees. The simplest form is that of a prism flattened anteroposteriorly, rounded superiorly and greatly narrowed inferiorly. In the larger and more complicated varieties there is merely an addition of one or more similar sections placed external to the primary.

The cubical capacity is as follows:—

Head	Right c.cm.	Left c.cm.
V	8.2	5.0
VII	3.8	3.6
X	1.9	2.2
XII	1.9	3.4
XIV	7.0	4.9
XVII	1.8	4.2
XVIII	4.0	3.2
XXVIII	2.4	3.7
XXIX	2.3	3.3
XXXI	0.9	3.9
Average	3.42	3.74

General average 3.58.

The extremes are head XXXI, right 0.9, and head V, right 8.2.

The superficial area is as follows:—

Head	Right sq. cm.	Left sq. cm.
V	32.3	26.6
VII	16.3	17.6
X	9.8	11.5
XII	7.9	16.7
XIV	28.6	21.1
XVII	8.5	17.5
XVIII	14.5	12.9
XXVIII	10.6	15.1
XXIX	11.0	14.2
XXXI	5.5	8.5
Average	14.50	16.17

General average 15.34.

The extremes are head XXXI, right 5.5, and head V, right 32.3.

It will be observed that in selecting the sinuses for measurement there has been no attempt made to group them so as to determine the total cubical capacity and superficial area of the sinuses on the right and left sides.

However, what has already been done warrants the hope that some interesting facts are to be brought out by such investigation.

THE PRODUCTION OF ANTIRABIC IMMUNITY BY INTRA-SPINAL INJECTIONS OF VIRUS.

By D. L. Harris, M. D., of St. Louis.

I have found that 'fixed virus,' i. e., a brain of a rabbit dead of the disease, when frozen with carbon-dioxide snow, dried in a vacuum at a very low temperature, and kept in an ice-box, will lose its infectivity only after a period of many months, and that the injection of this non-infectious material into the spinal canal produces a rapid and high degree of

immunity in dogs and rabbits. A single injection of a fraction of a grain by means of a lumbar puncture is sufficient to protect a rabbit against a simultaneous inoculation of its brain with twice an otherwise fatal dose of rabies virus. Rabbits, which have received a single intraspinal injection, withstand, a week later, ten to twenty times that quantity of rabies virus which is fatal to untreated rabbits.

The radical difference, between the immediate immunization established by the above method and the delayed immunization following the methods now employed in the various antirabic institutes, consists in the fact that I immunize the brain directly, while in the Pasteur method the brain cells are immunized circuitously, if at all, by injections under the skin.

In all the animals tested, no harm whatever followed the intraspinal injection, and if further experiments show that this administration is without danger to those and other animals, we shall be in possession of a better means for rapidly immunizing patients, especially those suffering from dangerous bites about the face and head, and those who apply for treatment some days after the infection.

The further advantage of having material for this treatment, which does not deteriorate with age, and which may be prepared and stored anywhere in quantity, is obvious to all.

THE SUPPRESSION OF CARDIAC FIBRILLATION BY SECTION.

(PRELIMINARY COMMUNICATION.)

By WALTER E. GARREY, Ph. D., M. D., of St. Louis.

I have confirmed my earlier finding that fibrillation of the auricles may be stopped by vagus stimulation, and sometimes that of the ventricles. This I believe is due mainly to decreased conductivity. If decrease in the possible number of paths can cause this cessation, a priori it should be possible to accomplish the same result by cardiac section, thus decreasing the mass of fibrillating tissue. This is in accord with the fact that fibrillating auricles recover spontaneously more readily than ventricles, and that the ventricles of small mammals recover more readily than those of large mammals. Experiments directed to test this view were positive.

Ventricles of dogs were made to fibrillate by various means. Pieces cut from these fibrillating structures stopped fibrillating, almost instantly, if they were small; and larger pieces, e. g., of 2 cm. diameter, also stopped, but only after several seconds. The larger mass from which the pieces were taken continued fibrillating. Pieces could be taken from any part of the ventricles with the same result. The experiments included pieces taken from the part stimulated to cause the fibrillation, and from the septum. These experiments dispose of the possibility of the existence of a fibrillation centre, and show that the process is one involving changes in which the whole structure participates. Pieces cut from fibrillating auricles also ceased contracting. In all instances the excised pieces, after cessation of fibrillation, were normally irritable and responded to stimuli with coördinated contractions; they were rhythmic in warm solutions of the proper composition. In instances where the main mass of the ventricles was cut away, leaving a small piece in normal relation to the auricles, this portion contracted coördinately with the auricles, while the excised portion continued to fibrillate until cut up into smaller pieces.

BOOK REVIEWS.

PSYCHOTHERAPY. Including the History of the Use of Mental Influence, Directly and Indirectly, in Healing and the Principles for the Application of Energies Derived from the Mind to the Treatment of Disease. By James J. Walsh, M. D., Ph. D., Dean and Professor of Functional Nervous Diseases and of the History of Medicine at Fordham University School of Medicine, and of Physiological Psychology at the Cathedral College, New York; etc. etc. New York and London: D. Appleton and Co. 1912. Price, $6.00.

This book is remarkable for the number of pages it contains and the amount of confusion that overwhelms the reader after he has attempted to finish it. It should have been entitled "The Treatment of Diseases in General," with an historical introduction of what the author deludes himself into believing is psychotherapy.

It is difficult to find out just what the author's point of view is. If he bases his idea of psychotherapy upon his explanation of psychical phenomena, then it is easily understood why his therapeutic method should be so formal and stereotyped. There is such a mass of astounding conclusions, based chiefly upon disputed, and even discredited facts, that one wonders just what the author is proposing to do. For example, the terminal separation of neurones and their supposed withdrawal from the contiguous terminals is seriously given as an explanation of fatigue states, sleep, hypnotism and other conditions of mental dissociation. Even if this hypothesis is admitted to be either true or adequate, one fails to see just what relation it has to the psychical treatment of nervous diseases.

Under the title of "General Considerations," the author groups a number of subjects, some pertaining to the domain of pure psychology, as attention, memory, feeling, etc., and others belonging to the subject of the physiology of the brain. This makes a mass of confused facts and theories, speculations and crude deductions, founded upon methods of reasoning by analogy which leaves the reader disturbed, irritated and semi-violent.

The chapter entitled "Vital Energy Behind the Brain Cell" makes one speculate as to the topographical location in regard to the nerve cell in which this energy might exert its force. The reviewer is led to suppose that the author is a vitalist, but this is a neo-vitalism which transcends the most metaphysical efforts that aim to render us on speaking terms with the unknown and intangible.

When the chapters on the actual use of psychotherapeutics in definite types of diseases are reached, the real test of a book of this kind begins. Here, again, the discursiveness, inaccuracy and silly optimism of the author are plainly shown. To say, for example, that many cases of lumbago or sciatica are psychoneuroses, and can be cured by suggestion, awakens in our minds the question of our author's serious purpose; for, if they are psychoneuroses, they certainly are not sciatica, or that much abused term, lumbago. Perhaps, this is an unfair example of the author's method, and perhaps, too, the physician who diagnoses conditions of this kind in this way had better use the smile of his personality, the warmth of his handshake and the low, but impressive, speech intreating his patients, than attempt to find out by x-ray examination, or other methods of physical diagnosis, to what these conditions are due.

So we proceed reading over chapter after chapter on organic diseases, all of which, from the standpoint of Dr. Walsh's psychotherapeutic methods, are treated exactly alike. The author gives us descriptions of all the well-known diseases, the type, etiology, pathology and prognosis, and for each of them the same stereotyped kind of psychotherapy, which for him means hope, cheerfulness, fresh air, exercise, good hygienic conditions, good humor, good work, good salaries and a general atmosphere of sunshine. All of these are undoubtedly good things; but why, we question, should they be emphasized, repeated and reiterated to the reader's utter weariness and boredom? It is

hardly necessary to repeat these examples, which are tedious and unprofitable. Our concern is really to point out that the author has misconceived the term 'psychotherapeutics' and has attempted to paint a rather crude description of diseases and system of mental therapy, which consists chiefly of the intuitive attitude of the hope and cheerfulness that every physician, naturally, has towards his patients. Add to this some physical measures, such as hydrotherapy, exercise, diet and orthopedic apparatus, and you have this book in a nutshell. All this could have been told in twenty-five pages, and has been told often and often, and just as entertainingly.

Of the real psychotherapeutics, the thing that we are all eagerly awaiting, a positive psychology of psychogenic diseases, this book does not even faintly touch upon, nor can we conclude from a perusal of its pages that the author has a proper conception of what should be expected in a treatise of this sort. Furthermore, he is not seemingly aware that at the present time there are many students seriously at work attempting to solve little by little some part of the abstruse and difficult problem, the whole of which he regards as apparently settled by means of 800 pages of loosely written irrelevancy.

SYPHILOLOGY AND VENEREAL DISEASE. By C. F. Marshall, M. D., M. Sc., F. R. C. S., Surgeon to the British Skin Hospital, Late Assistant-Surgeon to the Hospital for Diseases of the Skin, etc. etc. Second Edition. London: Baillière, Tindall and Cox. 1912. Price, 10s. 6d.

Since the first edition of this book was published in 1906, much light has been thrown upon the pathology of syphilis. The results obtained by Metchnikoff, Roux, Neisser and others by the experimental inoculation of monkeys, the discovery of the Wassermann reaction, and above all the finding of the specific micro-organism by Schaudinn and Hoffmann, are treated in this volume with care and consideration, and with that due regard for readable English which is always a delight in medical books on account of its rarity.

Besides the general historic considerations, and the pathology of syphilis as it manifests itself in disturbances of the various organs and tissues, the important subject of parasyphilis receives most thorough consideration. This is true especially of syphilis of the nervous system. The chapter on tabes is particularly encyclopedic and presents the pathology and treatment of this most frequent of the syphilitic affections of the nervous system in a thorough manner.

Not the least interesting of the chapters is the one on syphilis of the third generation; and when we consider that syphilis has the greatest tendency to hereditary transmission and that the transmission may reach the third generation, that the disease is frequently unrecognized or wilfully concealed or wrongly diagnosed, that many persons contract syphilis accidentally, and that most cases of syphilis are insufficiently treated, the conclusion is easily reached that not many families in civilized countries are altogether free from traces of a syphilitic taint.

Gonorrhea and its various manifestations take up the remainder of the book, the concluding chapters of which are on the serum diagnosis and the value of the Wassermann reaction.

This volume is sure to take front rank as a textbook for students and as a ready reference for the busy practitioner, for no other treatise on venereal subjects, which is known to us, is so comprehensive, thorough, terse and practical.

SYMPTOMS AND THEIR INTERPRETATION. By James Mackenzie, M. D., LL. D., Aber. and Edin., Lecturer on Cardiac Research, London Hospital; Physician to the Mount Vernon Hospital, etc. etc. Author of "Diseases of the Heart," "The Study of the Pulse, Arterial, Venous, and Hepatic, and of the Movements of the Heart," etc. 2nd Edition. New York: Paul B. Hoeber. 1912. Price, $3.00.

Although only a brief space of time has elapsed since the first edition of Mackenzie's book appeared, it has already become a classic. While the title might lead one to expect a more general discussion of symptomatology, the book is practically a disquisition on the diagnostic significance of pain. It is a matter of daily observation that the place in which the patient feels pain, or the areas of tenderness, are by no means always identical anatomically with the site of the lesion. One need only remember the backache of pelvic disease or the arm-pain of angina pectoris. Nevertheless, as Mackenzie shows, the location of pain or of hyperalgesia bears a constant and significant relationship to the visceral lesion. In general, the viscera themselves are not painful if

diseased. They transmit pain impulses to the central nervous system and the resulting sensation of pain is referred to a portion, or to the entirety, of those spinal segments that are concerned with the viscus in question. It follows that while the pain may be felt in a location distant from the site of the disease, the two portions of the body bear a definite and more or less constant relationship to each other; and, from the nature and situation of the pain, the responsible organic lesion may often be inferred. Much of what Mackenzie presents is not new, but the charm of the presentation and the interest of the illustrative cases render the book delightful reading. To many it will open up a new world of clinical observation.

DIE BEHANDLUNG DER FRAUENKRANKHEITEN. Fuer die Praxis dargestellt. Von Dr. J. Veit, O. O., Professor und Direktor der Universitaets-Frauenklinik in Halle a. s. S. Geh. Med. Rat. Mit 39 zum Teil farbigen Abbildungen. Berlin: Verlag von S. Karger. 1911.

A volume on the treatment of gynecological diseases from the pen of Veit cannot fail to arouse the interest of all gynecologists. Only a few of the living gynecologists have been as closely identified with the progress of this specialty as the author of this book. In his well-known fluent style he describes the striking difference between the present day practice of gynecology and the office of the popular gynecologist of the past, crowded with women enthusiastic over the wonderful (psychic!) results derived from douches, tampons, pelvic massage, electricity and the like. And only a few years later surgical methods yielded still better results,—wide crevices had to be sewed up, narrow ones widened, and if then a little too wide sewed up again. Advance in our knowledge of gynecological pathology to-day demands from the gynecologist to look for a definite lesion, and to treat the same, conservatively or surgically, as the case may require. The gynecologist must be familiar with both methods of treatment, and, therefore, the general surgeon never can be a competent gynecologist, while obviously the good gynecologist still may be or should be competent to do all sorts of abdominal operations.

The book devotes much space to a critical consideration of the various conservative modes of treatment recognized to-day as valuable; but obviously more room is taken up with the description of the various operations and the careful enumeration of their indications and contraindications. To recommend a perusal of this volume to anyone interested in modern gynecology must appear superfluous, since its merits are a foregone conclusion.

LES PARASITES INOCULATEURS DE MALADIES. Avec 107 Figures Dans le Texte. By Dr. Jules Guiart, Professor à la Faculté de Médecine de Lyon. Paris: Ernest Flammarion. 1911. Price, 3 fr. 50.

This semi-popular work of 362 pages is interesting largely from the graphic presentation of the subject-matter, and is, in this respect, a commendable example of the growing tendency to place in the hands of the public authoritative statements of those aspects of medicine and hygiene which are most important and practical. The scope of the work is admirably planned. After a somewhat philosophical introduction dealing with the evolution of parasitology, both from the standpoint of biology and of medicine, the author divides his discussion into two parts—namely, diseases transmitted by insects and diseases transmitted by intestinal worms. Such subjects, as mosquitoes and filariasis, mosquitoes and malaria, mosquitoes and yellow fever, flies and sleeping sickness, plague, intestinal worms, worms which inoculate the tissues with germs, appendicitis, typhoid fever and cholera, and the rôle of intestinal worms in veterinary medicine, receive a somewhat detailed account; and a final chapter containing general conclusions is both instructive and interesting.

Throughout the work the author as a rule contents himself with compiling facts and opinions from other sources. In a few instances, however, he presents his own researches and conclusions, as, for example, on page 305, after detailing his personal observations, he confirms the work of various French authors on the rôle of *Trichocephalus* in enteric fever in these words: "Typhoid fever is a bacterial infectious disease with an intestinal point of entry; and it is the *Trichocephalus*, an intestinal parasite, which, in most cases, opens the door of infection."

The work is illustrated with 107 figures of rather uneven merit, and, in spite of occasional carelessness in nomenclature, can be commended as a useful compendium for the educated public.

DISEASES OF THE EYE. A Manual for Students and Practitioners. By J. Herbert Parsons, D. Sc., M. B., B. S., F. R. C. S., Ophthalmic Surgeon, University College Hospital; Surgeon, Royal London (Moorfields) Ophthalmic Hospital, etc. Second Edition. Philadelphia: P. Blakiston's Son and Co. 1912. Price, $4.00.

Dr. Parsons' "Manual" is decidedly more than a mere handbook; it is a remarkably complete exposition of the more important features of modern ophthalmic practice. The work is divided into six sections, which in turn are subdivided into thirty-one chapters. Section 1 deals with "Anatomy and Physiology," Section 2 with "The Examination of the Eye," Section 3, "Diseases of the Eye," Section 4, "Errors of Refraction," Section 5, "Disorders of Motility," and Section 6, "Diseases of the Adnexa."

Unusual in a book of this type is a chapter on the "neurology of vision" in which is discussed briefly, yet clearly, the principal facts of ophthalmic neurology. The work really stands midway between such excellent handbooks as May's and Veasey's and the larger single volume textbooks. It can be unreservedly recommended to the beginner in ophthalmology, to the general practitioner, and will also be found of great help to busy specialists.

THE TECHNIQUE AND RESULTS OF RADIUM-THERAPY IN MALIGNANT DISEASE. By N. Dominici, M. D., Paris, Chef du Service de Pathologie, Interne, Laboratoire Biologique du Radium, and A. A. Warden, M. D., Glasgow and Paris, Visiting Physician to the Hartford British Hospital. Reprinted from "The British Medical Journal" of August 27th, 1910, with additional Plates and more recent Notes, March, 1912. London: J. and A. Churchill. 1912. Price, 75 cents.

Wickham's marvelous work with radium in malignant disease is almost equaled by Dominici. The technique which this author advances is too complicated to be followed in the sort of hospital found in the large majority of cities, but this does not mean that it is not worthy of study and that, if followed in a well-appointed laboratory and with intelligence, the results will not be as successful as in the author's hands. Endowed institutions should not overlook this book, for, where expense need not be considered, a laboratory such as the author advocates must surely be an incomparable asset to a hospital. Fully to appreciate what can be done with radium when manipulated by one who has the technique at his fingers' ends, a close and careful perusal of this book is absolutely necessary.

SURGICAL OPERATIONS. A Handbook for Students and Practitioners. By Prof. Friedrich Pels-Leusden, Chief Surgeon to the University Surgical Clinic and Chief of the University Surgical Polyclinic in the Royal Charity Hospital of Berlin. Only Authorized English Translation, by Faxton E. Gardner, M. D., New York. With Six Hundred and Sixty-eight Illustrations. New York: Rebman Company. Price, $7.00.

The style of the translation commends the book, though at times the original idiom is imitated, but the author's direct manner of dealing with surgery makes this one of the best guides for practitioners. The school is distinctly German, perhaps an advantage, if for no other reason than to draw our attention to the fact that excellent surgery can be practised without the constant succor from English or American ideas, though at first one's attitude is likely to be resentful of the almost entire omission of reference to any of our cherished names. It would not profit here to note some instances where our work is on what we think a higher plane, or to discuss minor differences of views. Certainly we can graciously welcome an excellent collection of well-expounded descriptions of surgical operations of all degrees of magnitude.

DIE ROENTGENSTRAHLEN IN DER GYNAEKOLOGIE. Mit einem Ausblick auf ihren kuenftigen Wert fuer soziale und sexuelle Fragen. Von Dr. med. Manfred Fraenkel, Charlottenburg. Mit 14 Tafeln und 46 Abbildungen im Text. Berlin: Richard Schoetz. 1911. Price, cloth, 8.50 m.

The literature of the past few years, especially German gynecological literature, has contained many papers dealing with the value of x-rays in the treatment of diseases and abnormal functions of the female genitalia. For several years the author of this volume has carried on original researches concerning the specific effect of Roentgen rays on the various parts of the reproductive system of women. The results of his own scientific and therapeutic investigations,

together with the results of all the other workers in this field, are embodied in this very interesting book. The wealth of its contents can be surmised by the following titles of some of the fourteen chapters: *x*-rays in the treatment of carcinoma, myoma, struma, hemorrhages, osteomalacia, dysmenorrhea, endometritis, etc.; the technique of *x*-ray application; effect on ovaries; proof for the possibility of the transmission of acquired characteristics, furnished by the author's experiments on animals; influence on pregnancy, production of abortion; forensic and social importance of artificial sterilization of women by means of radiation of the ovaries; treatment of nervous disturbances due to sexual anomalies, etc.

La Sterilisation de la Syphilis. Par le Dr. Lehedde. Paris: A. Maloine. 1912. Price, 2 fr. 50.

This small volume is well worth reading provided the reader is in accord with the author in regard to his rather enthusiastic advocacy of salvarsan in the treatment of syphilis. But should he be a bitter enemy of a drug which in these latter days is slowly usurping the throne so long occupied by mercury, it would be well for him not to have his ire aroused by the optimism of one whose praises amount almost to a pæan. Nevertheless, here is a book based on the author's experience with salvarsan, and being this sort of book it would ill befit a critic to cavil at what might seem at sight an over-appreciation of a new medicament. As regards salvarsan, what have not been the variegated experiences of physicians! What other preparation has called forth in recent years the same amount of praise, the same amount of abuse! And, this being the case, the weary critic whose brain has been muddled by the reading of multitudinous articles on salvarsan, none of which are in full agreement, may well welcome a book that is a clear exposition of an author's attitude, unattainted by the experiences of others.

Diseases of the Colon and Their Surgical Treatment. (Founded on the Jacksonian Essay for 1909.) By P. Lockhart Mummery, F. R. C. S. (Eng.), B. A., M. B., B. C. Cantab., Jacksonian Prizeman and late Hunterian Professor, Royal College of Surgeons; Senior Assistant Surgeon St. Mark's Hospital for Cancer, Fistula and other Diseases of the Rectum, etc. etc. Illustrated by Colored and other Plates and Numerous Figures in the Text, many of which are Reproduced from the Author's Sketches. New York: Wm. Wood and Company. 1910.

This volume covers in complete form the conditions that lead to surgical diseases, including in the treatise the developments, anatomy and, further on, the pathology of the colon. Mr. Mummery's reputation as an authority on abdominal diseases is upheld by this volume, and we find he represents the conservative note in the now rather radical attitude of English surgeons towards the diseases of the colon and cecum with their attending discomfort, constipation and autointoxication. The volume is most readable and complete.

For and Against Experiments on Animals. Evidence Before the Royal Commission on Vivisection. By Stephen Paget, F. R. C. S., Hon. Secretary Research Defence Society. With an Introduction by The Right Hon. The Earl of Cromer, O. M., G. C. M. G., G. C. B. New York: Paul B. Hoeber. 1912. Price, $1.50.

For a series of years ending with 1908 the Royal Commission on Vivisection heard evidence on the advisability of further restricting this means of scientific advance. The chief burden of the pro-vivisection side was borne by the Research Defence Society. The present volume, written at the request of the society by its secretary, Stephen Paget, is a selection from the most significant testimony taken by the Commission. The latter's formal report recently issued is voluminous, and for the general reader this briefer presentation is to be preferred. A great supply of pro-vivisection argument will be found between its covers. An interesting introduction is furnished by the Earl of Cromer, the president of the Research Defence Society.

Die Gynaekologische Prophylaxe bei Wahnsinn. Von Professor Dr. L. M. Bossi, Vorsteher der Universitæts-Frauenklinik zu Genua. Berlin: Oscar Coblentz. 1912. Price, 3 m.

The title of this little pamphlet, "Gynecological Prophylaxis of Insanity," thoroughly expresses the views held by its author concerning the intimate re-

lation in women between diseases of the genital tract and anomalies of the mind. Those who have occasion to read *Ginecologia Moderna*, a small monthly journal, edited by Bossi, must be familiar with his interest in this problem. The reports of the most wonderful cures of all forms of insanity by the simplest surgical procedures for the most trivial gynecological symptoms, regularly recorded in this journal, are interesting reading, but they are not convincing. The same may be said of this pamphlet: a record of success, not a single failure; at least none mentioned. So biased a representation of a pet idea, as is this brochure, proves nothing but the enthusiasm of its author.

PRINCIPLES OF MICROBIOLOGY. A Treatise on Bacteria, Fungi and Protoza Pathogenic for Domesticated Animals. By Veranus Alva Moore, B. S., M. D., V. M. D., Professor of Comparative Pathology, Bacteriology and Meat Inspection, New York State Veterinary College of Cornell University, and Director of the College. One Hundred and One Illustrations. Ithaca: Carpenter and Company. 1912.

This book is not only an excellent textbook on the subject of the bacteriology of diseases of animals, but it also possesses the additional value of being a good technical guide for the whole subject of microbiology. Almost all the technical methods needed in a bacteriological laboratory are well described, and for that reason the book fills a broader purpose than is actually claimed for it. Apparently the subject is brought well up to date, and the references to the literature seem well chosen. The heavy paper on which it is printed makes the book unnecessarily bulky.

DAS SEXUALLEBEN DES KINDES. Von Dr. Albert Moll. Leipzig: Verlag von F. C. W. Vogel. 1912.

Books, dealing with the sexual problem to-day, appear with striking frequency on the reviewer's table. With few exceptions they represent compilations of more or less generally known facts. Original investigations are distinctly in the minority. To this minority belongs this latest contribution of Moll, one of the best known scientific investigators of the sex question. A careful study of the sexual life of the child seems desirable, especially in view of the fact that to-day sex education, as generally believed, should begin in childhood; but, as in any other form of instruction, its results will depend upon the faculty of the teacher thoroughly to understand the ability of the child to grasp the presented subject. Contributions such as this by Moll will prove of great advantage, since an efficient form of sex instruction of the child is the one promising the solution of the sex problem.

SURGICAL AFTER-TREATMENT. A Manual of the Conduct of Surgical Convalescence. By L. R. G. Crandon, A. M., M. D., Assistant in Surgery at Harvard Medical School; Assistant Visiting Surgeon to the Boston City Hospital, etc. etc.; and Albert Ehrenfried, A. B., M. D., Assistant in Anatomy at Harvard Medical School; Surgeon to Mt. Sinai Hospital, etc. etc. Second Edition, Thoroughly Revised. With 265 Original Illustrations. Philadelphia and London: W. B. Saunders Co. 1912. Price, Cloth, $6.00; Half Morocco, $7.50.

This book has been deservedly popular, and the revision at this early date has evidently been so as to add further knowledge rather than to change. It is not only a mist judicious choice of methods of surgical after-treatment, but a handy guide to the complete management of a surgical illness. Nurses, students, internes, and surgeons will find it an invaluable book, written most interestingly and ful of helpful suggestions—a complete and thorough treatise on a subject that has received too little separate notice.

PRECIS D'ELECTROTHERAPIE ET DE RADIOTHERAPIE OCULAIRES. Par le Dr. A. Leprince (De Bourges). Avec 33 figures dans le texte. Paris; Librairie Médicale et Scientifique, Jules Rousset. 1911. Price, 3 fr. 50.

This handbook is divided into three parts: In the first is described the action of electric currents on the normal eye and the apparatus used in electrotherapy of the eye; in the second, methods of examination of the normal eye by the aid of electricity are discussed. The third part, which is much the most important, is a complete exposition of ocular electrotherapy. Numerous case reports serve to illustrate the general discussion. The book will be useful to oculists who desire to apply electro-therapeutic methods which have proved efficacious in the hands of those experienced in their application.

Diagnostic Methods, Chemical, Bacteriological and Microscopical. A Text-book for Students and Practitioners. By Ralph W. Webster, M. D., Ph. D., Assistant Professor of Pharmacological Therapeutics and Instructor in Medicine in Rush Medical College, University of Chicago, etc. etc. Second Edition, Revised and Enlarged, with 37 Colored Plates and 164 other Illustrations. Philadelphia: P. Blakiston's Son and Co. 1912. Price, $4.50.

This, the second edition of Webster's "Diagnostic Methods," is a great improvement over the first. The various methods of laboratory diagnosis are presented clearly and concisely, and the writer's judgment of what to include and what to leave out deserves special commendation. The discussion of the Wassermann test is especially complete. The physician who does his own laboratory work will find this a useful book for reference.

The Modern View of Syphilis and Its Treatment. By Gustav Baar, M. D., (Vienna), Member German Congress for Internal Medicine, etc. New York and London: D. Appleton and Company. 1910.

The fact that latent visceral syphilis, in many instances, is unrecognizable by the average physician is the incentive which dictated this book. This is also a very laudable reason, since the modern methods of diagnosis have been of great assistance in clearing up certain latent syphilitic conditions, especially of the vascular system.

Prof. Baar has given in his little book that personal touch which bespeaks experience. The book is worth while and no one need regret the time spent reading it.

The Wassermann Reaction. Its Technique and Practical Appliance in the Diagnosis of Syphilis. By John W. Marchildon, B. S., M. D., Assistant Professor of Bacteriology, St. Louis University Medical School. Eleven Illustrations and Colored Frontispiece. St. Louis: C. V. Mosby Company. 1912. Price, $1.50.

More and more the Wassermann reaction is coming to be recognized as indispensable both for determining a possible syphilitic element in obscure cases and in giving the physician some idea of the efficacy of his treatment in outspoken syphilitic cases. The technique is difficult and, unless it is accurately carried out, the test is rendered worse than useless. It will probably always remain the task of the trained bacteriologist. Nevertheless, the practitioner should know what the test is and how it is done. The requisite information is scattered throughout the literature, and its clear and concise presentation in this booklet is to be welcomed. This volume, or one like it, should be on the shelves of every physician.

Techniques du Diagnostic par la Méthode de Déviation du Complément. Par P.-F. Armand-Delille. Paris: Masson et Cie. 1911. Price, 5 fr.

The various hemolytic methods, of which the most important is that of Wassermann, are attaining a constantly growing importance in practical medicine. The physician, who wishes to familiarize himself with their theoretic basis, their significance and their technique, was until recently compelled to wade through a wilderness of articles in the current journals. Of late, however, a number of summaries of our knowledge in this field, in book form, have appeared, of which this is one of the most attractive. In a clear and interesting fashion, the subject is presented both from the theoretical and technical sides, chief stress being laid, as is natural, upon the work of Frenchmen. The little book will prove useful, not only to the practitioner, but also to the laboratory worker himself, and we can unreservedly commend it to all of our confrères who read French.

Elementary Bacteriology and Protozoology. The Microbiological Causes of the Infectious Diseases. By Herbert Fox, M. D., Director of the William Pepper Laboratory of Clinical Medicine in the University of Pennsylvania; Pathologist to the Zoological Society of Philadelphia, etc. Illustrated with 67 Engravings and 5 Colored Plates. Philadelphia: Lea and Febiger. 1912.

This is primarily a textbook for nurses. It is clearly and accurately written and whatever is not essential to the purpose of giving the nurse an adequate notion of the why and how of bacteriological procedures has been omitted. Emphasis is laid upon how bacteria pass from body to body and act when once within, and their manner of exit. The book fulfils its function well.

INDEX.

T